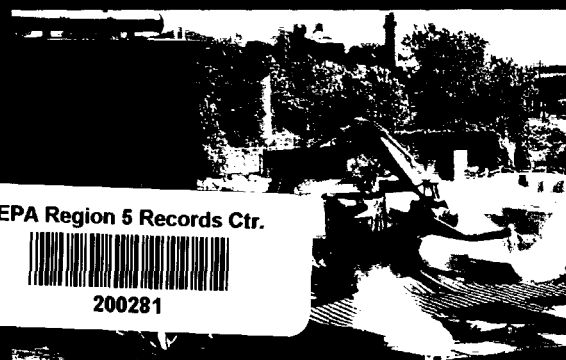


# **FINAL REPORT for the PHASE I TIME-CRITICAL REMOVAL ACTION ACTIVITIES**

EPA Region 5 Records Ctr.



200281



## **at the Master Metals, Inc. Site**



### **Cleveland, Ohio**

Prepared by ENTACT, Inc.  
April 24, 1998



Ababi Harris  
Remedial Project Manager  
U. S. EPA  
77 West Jackson  
Chicago, Illinois 60604

RE: Master Metals Phase I Time-Critical Removal Comments

Dear Mr. Harris:

Please find enclosed one (1) revised copy of the Phase I Time-Critical Removal Activities Report (without appendices) for the Master Metals Site in Cleveland, Ohio. Also enclosed is two new appendices: Appendix N and Appendix O. These appendices are to be placed at the end of the third binder submitted with the original document. All other appendices have remained unchanged. ENTACT has revised the document based on U. S. EPA and Ohio EPA comments communicated in a March 16, 1998 letter.

The Phase I report comments expressed in the aforementioned letter and ENTACT's modifications to the Phase I report are as follows:

**U.S. EPA Comment #1, General:** Please provide a good faith estimate of the total costs incurred in accordance with the Administrative Order on Consent (page 17).

ENTACT Response: In accordance with the Administrative Order, the total costs incurred for the Phase I Time-Critical Removal was \$2.1 million.

**U.S. EPA Comment #2, Section 2.4 Site Preparation:** Please include copies of the permits and licenses listed on Page 5 in accordance with page 17 of the Administrative Order on Consent.

ENTACT Response: The permits listed in this paragraph have been added to a new Appendix N. The asbestos abatement information was included in the original submittal as Appendix G. The text in this section has been modified to reflect this addition.

**U.S. EPA Comment #3, Section 3.1.1 Discussion of Results (Table 3-1):** Please clarify why the MiniRam Reading data for 10/11/97 (Appendix A) were omitted from Table 3-1.

ENTACT Response: The MiniRAM data from 10/11/97 has been added to the table.



of the laboratory chemicals and other representative waste streams. This information can found in Appendix O. The appropriate references have been made in the text.

**U.S. EPA Comment #7, Section 7.3.2 Laboratory Verification (Tables 7-1 and 7-2):** Please clarify the discrepancy between the narrative and the tables with respect to the choice of the grids for laboratory verification of lead. According to the narrative, three samples were collected from the eleven grids found to contain native sand or gravel for laboratory verification (Table 7-2). However, one of the grids chosen for laboratory verification, Z1, is described in Table 7-1 as “black, brown, rust slag” and not native sand or gravel; please clarify why this specific grid was chosen. Also, please ensure grid correspondence between Table 7-1 and Figure 7-1.

ENTACT Response: The description of each grid represents the majority of material in that grid. However, grid Z1 was predominately slag. However, this grid also contained significant amounts of sand. Note that grids AA1 and BB1 also contain large quantities of sand. Therefore, this sampling location was chosen for sample collection.

This section has been changed to read “Verification samples were collected at a minimum frequency of 20% for laboratory analysis from grids where fill materials (i.e. slag, cinders, sludge, etc.) were not observed. Table 7-1 contains descriptions of materials contained within each grid. It should be noted that the description of each grid represents the majority of material in that grid.

Fifty grids were established for the grid system and approximately eleven of these grids were determined to contain native sand or gravel. Grid Z1 was predominately slag although it also contained significant amounts of sand. Note that grids AA1 and BB1 also contain large quantities of sand. Therefore, this sampling location was chosen for sample collection. Three samples were collected from these eleven grids by selecting the three highest XRF readings.”

In addition, Figure 7-1 has been clarified to more accurately reflect the data in Table 7-1.

**U.S. EPA Comment #8, Section 8.1.2 Treatability Sample Analysis (Table 8-2):** With reference to the comment (paragraph 3) that the treatability test results show that the west streams were successfully treated to nonhazardous characteristic levels, the data (Table 8-2) appear to indicate that lead was treated to nonhazardous characteristic levels. However, cadmium in certain waste samples (for example, SDY-04) remained above the TCLP levels, and data on cadmium and arsenic were also not provided for several samples (for example, SDY-01, SDY-03, SDY-09-2). Therefore, the narrative needs to be modified to reflect this. Additionally, the post treatment levels with respect to adding the 10%-5% of treatment blend to SDY-01 and the (final) levels detected in SDY-09 should be provided to demonstrate that the TCLP levels were lowered to below non-hazardous characteristic levels. Minor discrepancies (transposition error, revealed on spot checking) also exist between the levels provided in Table 8-2 and the analytical data sheets provided in Appendix J.

**U.S. EPA Comment #4, Section 5.1 Decontamination Activities (Furnace Structure):** Please clarify the collection mechanisms used to deal with the decontamination water from the high pressure water blasters used in the decontamination of the furnace structure.

ENTACT Response: The text has been revised to read "Once gross contamination was removed from the floor and sumps, the structure was decontaminated using high pressure water blasters. Decontamination water generated during these activities was directed with berms and a water vacuum boom. In addition, crew members on the ground directed water with squeegees and pumps. Collected water was used during treatment activities."

**U.S. EPA Comment #5, Section 5.1 Decontamination Activities (Baghouse Facility), (Table 5-1, Table 5-2):** Please explain the implication of the Scarification and Exterior Decontamination Verification results of greater than 5mg/L for TCLP Lead in the context of the narrative on decontamination activities.

ENTACT Response: This section has been augmented to read "Once all contamination had been scraped from the floor, the interior of the entire building was scarified using abrasive blasting to remove the surface of the interior cinder block. The interior of the baghouse contained nine individual cells resulting in thirty-six separate cinder block surfaces. Each surface was sampled to determine if the abrasive blasting treatment was an effective treatment for the cinder block. Table 5-1 shows the laboratory results for the cinder block treatment. Any samples exhibiting greater than 5 mg/L TCLP lead or 1 mg/L TCLP cadmium resulted in retreatment of the entire wall section. Then another wall sample was analyzed. Abrasive blasting continued until all samples exhibited less than 5 mg/L TCLP lead and 1 mg/L TCLP cadmium. This treatment technology proved effective in removing the D008 and D006 toxicity characteristics and the K069 listing.

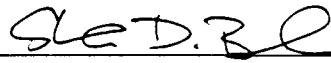
Following the interior abrasive treatment, the brick building exterior was hydro-blasted utilizing 3,200 p.s.i. water blasters. Table 5-2 shows the laboratory analysis for the ten exterior brick samples. Three samples (BRCK-02, BRCK-07, and BRCK-08) exhibited TCLP levels in excess of the 5 mg/L TCLP lead. Therefore, these sections of brick were retreated and analyzed until the brick did not exhibit the TCLP characteristics of 5 mg/L TCLP lead.

Laboratory reports from interior and exterior scarification decontamination verification are included in Appendix F. Upon completion, the top two baghouse stories were ready for demolition."


**U.S. EPA Comment #6, Section 6.3 Laboratory Chemicals:** Ohio EPA would appreciate documentation (in an appendix) on the disposal of the laboratory chemicals, documenting compliance with the applicable regulations.

ENTACT Response: Hundreds of manifests were generated over the course of this project. In order to save paper, ENTACT has provided examples of manifests which were used for transport

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.



Shane D. Banks  
Project Engineer, ENTACT Inc.



Date

**FINAL REPORT for the  
PHASE I TIME-CRITICAL  
REMOVAL ACTION  
ACTIVITIES**

**at the**

**Master  
Metals, Inc.  
Site**

**Cleveland, Ohio**

**Prepared by ENTACT, Inc.  
April 24, 1998**



# **FINAL REPORT for the PHASE I TIME-CRITICAL REMOVAL ACTION ACTIVITIES**

Master Metals, Inc. Site    Cleveland, Ohio

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## Executive Summary

This document presents the Final Report for the Time-Critical Removal Action for the Master Metals, Inc. (MMI) site in Cleveland, Ohio. The Final Report has been prepared by ENTACT Inc. (ENTACT) in accordance with the terms of the Administrative Order by Consent pursuant to Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606 (a) (Order), issued on April 17, 1997 by the Environmental Protection Agency, Region 5 (EPA).

The Administrative Order Section V.2 designated the Scope of Work to be performed for the Phase I Time-Critical Removal Action. The primary elements of the Time-Critical Removal Action outlined in the Order included the following:

- Analysis and mapping of all waste materials and contamination at the facility for removal purposes;
- Long-term securing of the facility against trespassers through the use of fences, signs and other devices, as necessary;
- Excavation, demolition, consolidation, and/or removal of highly contaminated buildings, structures, soils, loose waste materials, loose industrial debris and office or industrial equipment, where such actions will reduce the spread of, or direct contact with, the contamination;
- Removal of drums, barrels, tanks, or other bulk containers that contain or may contain hazardous substances or pollutants or contaminants where such actions will reduce the likelihood of spillage or of exposure to humans, animals or the food chain;
- Containment, treatment, disposal, or incineration of hazardous materials, where such action is necessary to reduce the likelihood of human, animal or food chain exposure.

This report satisfies all requirements for work at the site as identified in the EPA approved Work Plan for the Time-Critical Removal Action at the Master Metals, Inc. Site in Cleveland, Ohio (ENTACT, May 1996). Site removal activities focused on the immediate removal of exposed contaminants in order to greatly reduce potential exposures of hazardous materials.

Removal activities involved the characterization and removal of non-hazardous materials and removal or treatment and disposal of hazardous materials. During the course of this project, ENTACT handled 4,800 cubic yards of solid non-hazardous waste, 500 cubic yards of brick/concrete special waste, 21 tons of asbestos containing material, 1,160 cubic yards of K069, D006, D008 waste, 3,600 pounds of chromium trioxide, and over 200 bottles of laboratory chemicals. Over 3,000 gallons of liquid wastes were characterized throughout the course of this removal.

The results of this Time-Critical Removal Action are that all highly contaminated structures were demolished; hazardous and non-hazardous materials were characterized and disposed of accordingly; and the facility was secured to prevent unauthorized entry. These activities have addressed the concerns associated with the potential of exposure of humans, animals or the food chain to hazardous materials emanating from the Master Metals, Inc. site.

The project was executed in a health and safety oriented, time effective, and quality conscious manner, while simultaneously achieving site goals. ENTACT's execution of this removal action has been completed in full compliance with the issued administrative order and all activities were conducted in a manner which has provided for a safe, efficient and effective remedial solution.

# 1.0 Introduction

This Phase I Final Report discusses the activities conducted during the Time-Critical Removal Action, as outlined in the Administrative Order By Consent pursuant to Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a) (Order), for the Master Metals, Inc. (MMI) facility. Specifically, the MMI facility located at 2850 W. Third Street in Cleveland, Ohio.

The following Phase I Final Report will outline the Time-Critical Removal Actions conducted at the MMI facility in accordance with the Order. Removal activities were conducted at the facility from June 9, 1997 through January 6, 1998. This Phase I Final Report as well as the Time-Critical Removal Actions were performed by ENTACT, Inc. (ENTACT) of Wood Dale, Illinois.

## 1.1 Site Description

The MMI Facility (the "Site"), located at 2850 W. Third Street in Cleveland, Ohio, occupies approximately 4 acres of land in the "flats" area of downtown Cleveland, in a heavily industrialized area (Figure 1-1). It is bordered on two sides, the north and west, by railroad tracks: West Third Street runs north-south on the eastern border; and, a dead-end street and an abandoned industrial property lie directly south of the Site. The Cuyahoga River is located approximately 1,250 feet to the east. The nearest residential area is approximately 1/3 mile to the north-west. Access to the MMI Site is provided from West Third Street at the northeast corner and the southeast corner of the MMI property.

Major features at the Site, prior to removal activities, included: the office building, a secondary lead smelting furnace building, two large brick baghouses, the roundhouse building, storage buildings, several debris and material storage bins/boxes, and an above-ground storage tank farm. Figure 1-2 depicts the site prior to mobilization of ENTACT crews.

## 1.2 Site History

Activities at the Site began in 1932 with its construction on historic fill which included slag (presumed to have originated from local steel mill operations) and other non-native fill materials. The secondary lead smelter produced lead alloys from lead-bearing feedstock comprised

of recycled lead-acid batteries, lead scrap metals and dross. Feedstock preparations facilities at the Site included a battery decasing operation.

The site was constructed by National Lead Company ("NL") in 1932 and operated by NL until 1979 when it was sold to MMI. Thereafter, MMI continued to operate the Site as a secondary lead smelter, receiving lead-bearing materials from off-site sources. MMI utilized a rotary smelter and refining kettles to produce lead alloys in the form of ingots. Each exhaust producing process operation was serviced by a ventilation system and baghouse to control the workplace environment and potential airborne particulate emissions. By-products from the smelting operations included furnace flux, slag, dross, baghouse fines, and furnace sludge. Most of the material was recycled back into the furnaces for additional lead recovery. Finished lead ingots were stored in the roundhouse at the northern end of the property prior to shipment off-site.

In July 1992, U.S. EPA contracted with an outside technical assistance team (TAT) to collect soil/fill samples on and around the Site property to determine if the Site contaminants were subject to airborne transport. Analysis of these samples for RCRA metals revealed that lead, arsenic, and cadmium were present in concentrations exceeding their respective TCLP threshold limits both inside and outside of the facility.

On August 5, 1993, the Ohio EPA director ordered MMI to cease operations until it could demonstrate compliance with all applicable or relevant and appropriate requirements (ARARs). On March 28, 1995, U.S. EPA's RCRA Division deferred the Master Metals, Inc. Site to CERCLA for cleanup. In an August 22, 1995 letter, MMI withdrew all permits still in effect, effectively terminating its ability to legally treat, store or dispose of hazardous waste at the site.

Throughout 1995 and 1996, vandals and scavengers visited the Site on an intermittent basis. Further, during this period of time, MMI partially demolished one of the Site structures, leaving piles of rubble, structural steel, and sheet metal standing around the structure's remains.

Additional site history information is also contained within the Order provided in Appendix A.

### **1.3 Phase I Time-Critical Removal Action (TCRA) Objectives**

During the Phase I TCRA, ENTACT performed the following actions:

- Analyzed and mapped all waste materials and contamination for removal purposes, delineating the location of all waste materials and the extent of contaminant toxicity and potential for migration.
- Secured the Site against trespassers through the use of fences, signs and other devices, as deemed necessary.
- Excavated, demolished, consolidated and removed highly contaminated buildings,

structures, soils, loose waste materials, loose industrial by-products, construction materials, demolition debris, machinery, garbage, dusts, post-industrial debris and office or industrial equipment.

- Removed drums, barrels, tanks, or other bulk containers that contained hazardous substances or pollutants or contaminants.
- Contained, treated, disposed and incinerated hazardous materials.

The actions taken to comply with the Order are outlined into the following sections: Mobilization and Site Preparation; Air Monitoring Procedures and Results; Waste Characterization; Decontamination and Demolition; Removal of Hazardous Substances; Excavation; Treatment and Disposal; and Site Restoration. The details of these activities are discussed in the following sections.

## 2.0 Mobilization & Site Preparation

### 2.1 Site Health and Safety Plan

Mobilization to the MMI Site began with the implementation of the Phase I Site Health and Safety Plan (H&SP). This H&SP is included in Appendix B of the Phase I Time-Critical Removal Action Workplan (ENTACT, May 1997). This site specific document served as a guide to provide safe working procedures during the removal action at the Master Metals Site. Pursuant to the requirements of the plan, Mr. Don Self, ENTACT's Health and Safety Officer, periodically audited ENTACT personnel performance to ensure compliance.

### 2.2 Site Security

During mobilization, signs were placed on both entrance gates and around the perimeter fence to dissuade trespassers from entering the site and to indicate the hazards present. During the TCRA, site security was maintained 24 hours a day. Perimeter fences were repaired and

the erection of silt fences to control runoff and potential discharges to surface water, and the implementation of dust control measures to prevent fugitive airborne emissions. The details of these activities are provided in the sections which follow.

#### 2.3.1 Work Zone Establishment

Work zones delineated during the removal action consisted of three separate zones: the Support Zone, the Decontamination Zone, and the Exclusion Zone. The Support Zone was established in an area of the site isolated from the primary contamination and removal operations. The office trailer, supply storage, and sampling office were set up in this area and material transportation logistics were coordinated from this zone.

The Support Zone also served as the entry into the Decontamination Zone. This area presented the transition between the Support Zone and the Exclusion Zone. The



Site security and hazard identification

a security guard was stationed at the Site to discourage trespass during periods of inactivity. The preceding activities were effective in preventing the occurrence of any incidents during the removal action.

### 2.3 Site Control Measures

During the TCRA, control measures were implemented to reduce/eliminate the potential for off-site migration of contaminants. Control measures included: the establishment of work zones to contain contamination,



Work zone establishment - Exclusion zone

Decontamination Zone consisted of the decontamination trailer on-site which housed the personal protective equipment storage, shower facility, hand wash and eye wash station.

The Exclusion zone prevented unauthorized personnel from accidental entry into the work area surrounding highly contaminated areas and removal activities. This zone comprised the remainder of the site with an additional 100 foot radius established around activities performed with heavy equipment and around the soil

treatment and processing area. These work zones were instrumental in preventing any accidents during the completion of removal activities. Figure 2-1 depicts the location of the established work zones during the removal action.



**Personnel decontamination zone**

### 2.3.2 Stormwater Management

Stormwater runoff control was achieved by instituting engineering controls in areas where runoff could potentially leave the site. Primary areas of concern included the western border of the site where excavation activities occurred. Silt fence was erected along this border to prevent water migration off-site. Stormwater and water from misting activities was also diverted where possible into the existing acid collection tank and the on-site sediment sumps to control runoff.

Stormwater migration off-site via the existing storm sewer catchment basins was controlled by capping the storm sewer grates at the surface with polyethylene sheeting and a fiber-reinforced cement mixture. There were a total of five of these such storm sewer grates that required closure prior to initiation of removal activities.

### 2.3.3 Dust Emission Control

Large exposed waste piles and a layer of lead dust around the site necessitated the use of engineering controls to prevent fugitive emissions. Upon arriving on-site ENTACT crews installed a system of misting units to control airborne dust levels. It was soon determined that this system was insufficient for dust control purposes and a new system was constructed utilizing a combination of fire hoses and sprinklers.

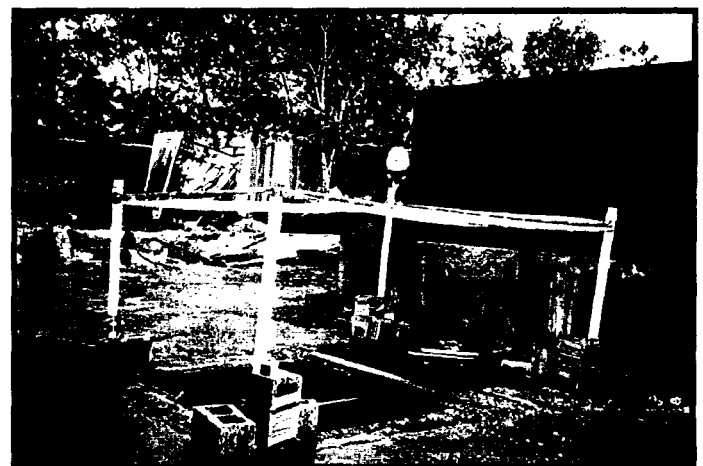


**Dust emission control during the TCRA**

The established sprinkler system was effective in wetting large areas that were heavily traveled by equipment. The fire hoses were also utilized to wet large ground areas as well as wetting the brick and metal structures on-site prior to demolition. This system proved to be more efficient in controlling airborne dust levels.

## 2.4 Site Preparation

Preparing the site for removal activities consisted initially of removing general site debris and trash from the Support Zone. Debris included trash from the office building on-site which showed evidence of vandalism. Additionally, loose debris was moved out of equipment travel paths throughout the remainder of the site. During this process any open sumps or other dangerous structures were marked to prevent accidental entry.



**Site preparation activities**

At the onset of mobilization activities, ENTACT acquired and posted the following permits and licenses for the removal action at the Master Metals site:

- Fire Hydrant Permit, City of Cleveland
- Permit for Hazardous Substances, City of Cleveland
- Sewer Connection Application, City of Cleveland
- Building Permit (demolition), City of Cleveland
- Asbestos Abatement Contractor License, State of Ohio

The asbestos abatement information can be found in Appendix G. All other permits can be found in Appendix N.

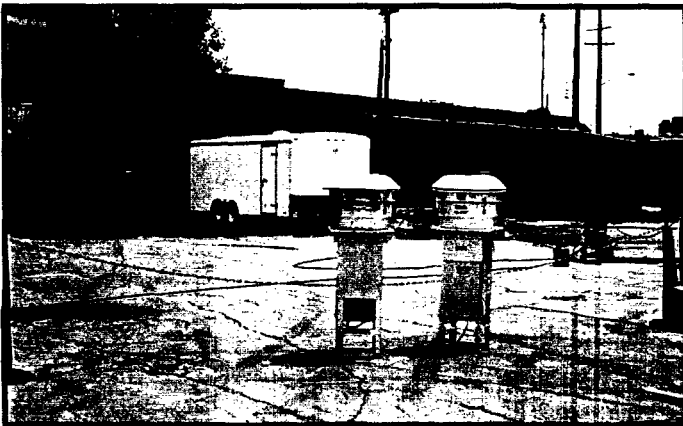
In preparation for excavation activities scheduled for later in the project, the appropriate entities were contacted to perform a utility locate on-site and around the perimeter of the site. A gas line entered the site from the south side was disconnected by East Ohio Gas Company. No other utility corridors were identified that would have been impacted during the removal action.

## 3.0 Air Monitoring Procedures and Results

Air quality data collected on site was obtained in three distinct operations. These operations were PM10 air sampling, random air monitoring, and personal/area air sampling. In addition to ENTACT's air sampling procedures, the City of Cleveland Bureau of Air Pollution Control continued operation of Total Suspended Particulate Matter (TSP) air samplers located directly south and near the northeast corner of the site.

### 3.1 Perimeter Air Sampling

PM10 air sampling stations were constructed around the inside perimeter of the site to monitor ambient air levels of lead particulates. Scaffolding was utilized to establish the PM10 inlets at a height that was in accordance with Clean Air Act (CAA) monitoring methodologies. Figure 2-1 shows the location of the PM-10 air sampling stations. These samplers were positioned in each of the corners of the site so as to provide for upwind and downwind lead particulate concentrations, regardless of overall wind direction.



Perimeter PM10 air samplers

These air samplers were operated continuously over 24-hour periods in accordance with the CAA. National Primary and Secondary Ambient Air Quality Standards for particulate matter of  $150 \mu\text{g}/\text{m}^3$  of air (based on a 24-hour average concentration) and  $1.5 \mu\text{g}/\text{m}^3$  for a 24-hour average for lead (based on a quarterly average) were adhered to throughout the duration of the removal action. These standards and sampling methodologies were also in compliance with the Ohio Environmental Protection Agency rules pertaining to emissions of particulate matter (Chapter 3745-17 of the Ohio Administrative Code).

#### 3.1.1 Discussion of Results

Perimeter air sampling was conducted throughout the duration of the removal activities on-site. Table 3-1 contains the results of PM10 air sampling conducted during the removal action. Results collected during the early stages of the project indicated that the emission control system established during site mobilization was not effective enough to reduce airborne lead dust concentrations to an acceptable level. Based on these initial results, the ENTACT field remedial team developed a new system of engineering controls to control fugitive dust emissions.

Air quality data collected after the implementation of corrective actions showed significant improvement in reduction of airborne lead dust concentrations. The quick response and implementation of additional engineering controls on-site resulted in lower fugitive dust emissions and no exceedances of the action level of  $1.5 \mu\text{g}/\text{m}^3$  (based upon a quarterly average) during the remainder of the project. Quarterly average lead concentrations for PM10 air sampling during the Time-Critical Removal Action at the Master Metals Site were as follows:

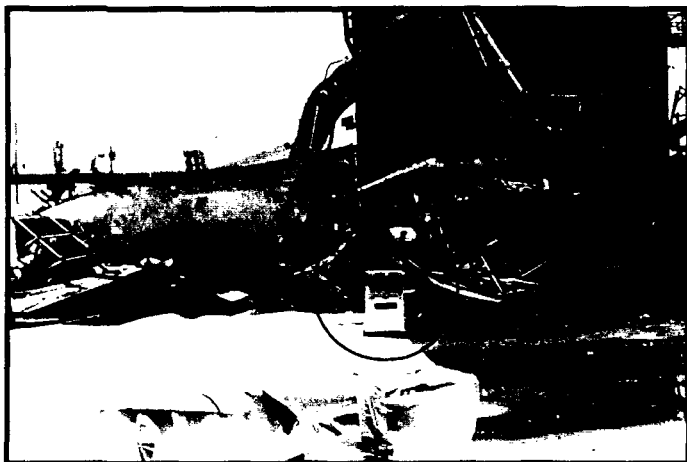
- |  |   |
|--|---|
| • Second Quarter '97<br>(Apr/May/June) | <b><math>3.02 \mu\text{g}/\text{m}^3</math></b> [20 data points]  |
| • Third Quarter '97<br>(July/Aug/Sept) | <b><math>0.735 \mu\text{g}/\text{m}^3</math></b> [79 data points] |
| • Fourth Quarter '97<br>(Oct/Nov/Dec)  | <b><math>1.48 \mu\text{g}/\text{m}^3</math></b> [16 data points]  |

The relatively high quarterly average for the second quarter of 1997 was a result of two factors. First, the quarterly average was computed using only 20 data points. Second, two sample results ( $31 \mu\text{g}/\text{m}^3$  and  $12 \mu\text{g}/\text{m}^3$ ) were collected from the same 24-hour sampling period during the very early stages of removal activities. Eliminating these sampling results from the data set collected during the second quarter yields a quarterly average of  $0.967 \mu\text{g}/\text{m}^3$ . PM10 sample filters were identified by the prefix HV along with the sequential number associated with the collected filter. Appendix A contains the analytical reports from ATC & Associates Laboratory in Indianapolis, Indiana for PM10 air sample filters submitted for total lead and suspended particulate matter.

### 3.2 Random Air Monitoring

A hand-held random air monitor (miniRAM) was utilized during the removal activities to measure airborne particulate matter concentrations within the exclusion zone. This device is a real-time monitor, which enabled ENTACT to evaluate the effectiveness of controls and make changes when necessary. On occasions when instantaneous readings exceeded  $150 \mu\text{g}/\text{m}^3$ , additional dust suppression measures were implemented.

During periods of precipitation, the miniRAM was ineffective. However, visual observations gauged the dust emissions during these periods which were naturally attenuated due to weather conditions. MiniRAM air monitoring results for the removal action are contained in Table 3-1 and the daily logs have been included in Appendix B.



MiniRAM air monitoring activities

### 3.3 Personal/Area Air Sampling

Air quality samples were also collected from low-volume (1-3 L/min.) personal air sampling pumps. These pumps were worn by ENTACT associates evaluate proper PPE requirements during the removal activities. In cases where the wearing of the pumps proved impractical, pumps were positioned directly in the immediate work area to ascertain the local airborne dust levels (e.g. cabs of heavy equipment, crushing equipment, treatment processing, etc.).

Because lead concentrations in the work area were sufficiently low, the majority of the on-site activities required only half-mask air purifying respirators. However, activities performed in enclosed areas such as dismantling of the furnaces and ball mills necessitated full-face air purifying respirators and/or supplied air in order to maintain safe work atmospheres. Throughout the TCRA, ENTACT adhered strictly to the protocols identified in the Health and Safety Plan. Personal/area analytical air data are included in Appendix C.

## 4.0 Waste Characterization

The first major task associated with the TCRA was to characterize the various types of waste found in the containers and piles on site. This characterization was achieved using a variety of techniques and approaches identified in the section which follows.

### 4.1 Visual Survey

The first step in the characterization process was a visual survey of the entire site to establish field sampling locations and to roughly determine waste types. Mapping of waste materials involved recording the locations, physical descriptions, approximate quantities, and types of containment (drum, box, etc.) found at the site. The visual survey step was completed by assigning a sample identification to each of the waste units.

### 4.2 Sampling Procedures

After completing the visual survey, parameters to be analyzed were determined for each sample based on knowledge of the site contaminants with a consideration for the disposal alternatives for the various waste types. For example, material which was believed to be listed hazardous waste (e.g. K069), was sampled and analyzed with the intention of off-site treatment and disposal. However, a material believed to possess sufficient lead concentrations to allow for asset recovery/recycling, was analyzed for total lead. Materials without any anticipated disposal alternatives were analyzed for both total and TCLP parameters to avoid sampling the material again at a later date.

#### 4.2.1 Soil and Solid Media Sampling Procedures

Sampling procedures for soil and solid media submitted for laboratory analysis were performed in the following manner. The sampling team adhered to the safety protocols defined in the Site Specific Health and Safety Plan. Staging areas in each location were established with polyethylene sheeting and included all necessary supplies to conduct the sampling. Laboratory-supplied glass sample containers were utilized for sample collection. Soil samples for characterization were collected as grab samples while waste pile and containerized material sampling was conducted by compositing samples.

Stainless steel trowels and bowls were utilized for compositing and collection of samples. Sampling equipment was decontaminated using an Alconox® detergent solution followed by a potable water rinse and a distilled water rinse. Equipment decontamination procedures were performed between each waste material sample collection. When disposable sampling media (i.e. glass drum thieves, plastic bowls, etc.) were utilized, disposable equipment was containerized and placed into the PPE disposal container on-site.

Sample containers were labeled with the sample ID, time, date, sample type, laboratory analyses, and sampler's initials. Chain-of-custody documentation was completed for each collected sample. Samples were delivered to either National Environmental Testing, Inc. in Bartlett, Illinois or Ross Analytical Services, Inc. in Strongsville, Ohio via overnight delivery. Samples were shipped in thermal chests packed in ice and sealed with signed and dated custody seals. Laboratory analytical from soil and solid media waste sampling is included in Appendix D.

#### 4.2.2 Liquid Media Sampling Procedures

Liquid media sampling for containerized liquids to be submitted for laboratory analysis was performed according to the sampling protocols outlined in the Phase I Time-Critical Removal Action Workplan. Sampling locations were identified during the initial visual survey. Liquid waste media were partially characterized during this survey by the existing labels and identification codes (UN numbers) present on the drums. Staging areas in each location were established with polyethylene sheeting and included all necessary supplies to conduct the sampling activity. Laboratory-supplied sample containers utilized for sample collection consisted of both 32 ounce glass and plastic containers. Highly corrosive liquids (e.g. sulfuric acid, sodium hydroxide, etc.) were collected in glass jars whereas waters, fuels and oils were collected in plastic containers for laboratory analysis.

Liquid samples were collected as composite samples by using a combined liquid waste sampler to collect the liquid media for laboratory characterization. Disposable sampling media (e.g. glass and plastic sampling equipment) were containerized and placed into the PPE disposal container on-site.

Sample containers were labeled with the sample ID, time, date, sample type, laboratory analyses, and sampler's initials. Chain-of-custody documentation was completed for each collected sample. Samples were delivered to National Environmental Testing, Inc. in Bartlett, Illinois via overnight delivery. Samples were shipped in thermal chests packed in ice and sealed with signed and dated custody seals. Laboratory analytical from liquid waste media sampling is included in Appendix E.

#### 4.2.3 Sampling Nomenclature

Samples for Waste Analysis and Mapping were identified by using the following prefixes for each of the waste streams present.

waste piles	-PLE
glass material	-GLS
drums	-DRM
above-ground tanks	-TNK
battery separators	-BTS
roundhouse drums	-RND
wood debris piles	-WDP
transformer	-TRNS
furnace material	-FRN
ball mill residue	-BLM
roll-off boxes	-RLF
sample buckets	-BKT
PPE debris	-PPE
other debris piles	-DBR

These prefixes allowed for efficient identification of a waste stream's characteristics on completed laboratory reports.

#### 4.3 Mapping

After completion of the identification and sampling of the various waste streams on-site, the materials characterized were located on a large aerial plot of the site. This plot was utilized by the ENTACT remedial field team and the field engineer to develop removal strategies for each of the approximately fifty (50) waste units on-site.

#### 4.4 Disposal Alternatives

Integral in developing the removal strategies to be employed for the waste streams on-site was the creation of a decision making flow chart for the solid and liquid media present. Figure 4-1 illustrates the decision process utilized. Removal activities were prioritized according to disposal alternatives in the following order:

- asset recovery
- recycling or reuse off-site
- decontamination and subsequent disposal at a Subtitle D landfill
- treatment and subsequent disposal at a Subtitle D landfill
- disposal at a Subtitle C landfill or hazardous waste incinerator

Where possible, materials were prepared for asset recovery or recycling/reuse as the most advantageous option. Materials whose characteristics rendered treatment infeasible (e.g. K069), hazardous waste disposal was the only viable option.

## 5.0 Decontamination & Demolition

Decontamination and demolition activities were the major portion of work occurring during the Phase I Time-Critical Removal Actions. All materials exiting the site as non-hazardous or recyclable and all portions of concrete slab were decontaminated. With the exception of the roundhouse and the attached office building, all on-site structures were demolished.

### 5.1 Decontamination Activities

Decontamination activities were conducted utilizing a series of high pressure hydroblasters with varying pressure and tip degrees. Hydroblasting pressures ranged from 3,200 to 5,300 p.s.i and tip configurations ranged from 0 - 45 degrees.

Areas that were heavy in gross contamination were first pre-cleaned. Work crews would first shovel areas with extensive contamination. If areas had considerable amounts of contamination and could be accessed

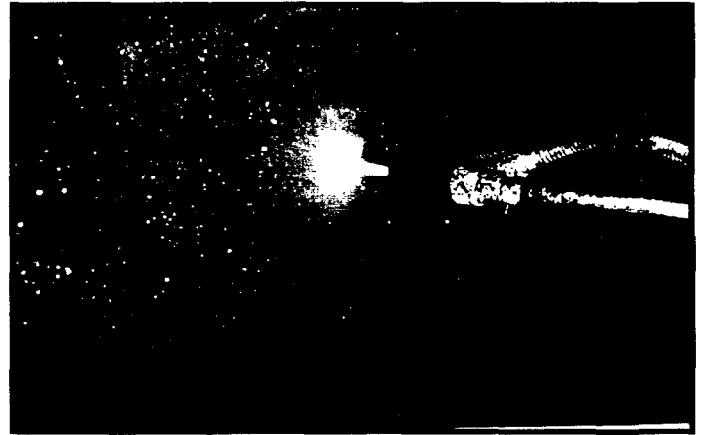


Decontamination activities

with a machine, a Bobcat would clear away the brunt of debris. Crews would then shovel remaining areas and hydroblast the surface. This method greatly reduced the amount of water necessary for misting. Dust suppression was utilized as necessary during these events.

In areas of open concrete slab, a Bobcat sweeper was utilized to gather up the contamination. The pad would first be wetted to minimize dust. The sweeper would then physically remove the gross surface contamination from the pad. Additional dust suppression was used around the Bobcat as necessary. Utilizing the

sweeper in this manner considerably minimized the amount of water generated and simultaneously reduced dust emissions.



Scarification with abrasive blasting in baghouse

### Decontamination - Areas of Interest

The baghouse facility, the furnace structure, and the roundhouse building were the focus of considerable effort. These three structures presented significant challenges due to the gross contamination that they contained, their state of structural deterioration, and the different types of hazardous materials that they possessed.

#### Baghouse Facility

The baghouse facility was constructed of a brick exterior and cinder block interior. It had been resurfaced at least one time in the past. Some of its mortar had deteriorated and a very large crack was evident on its south face. Particular interest was placed on this building because it contained substantial amounts of K069 waste.

Given the appearance of the structure and concerns for health and safety, a Ohio registered structural engineer was brought on-site to determine the building's integrity. Once deemed safe, decontamination activities began.

Work began inside the building with the removal of all baghouse filter bags. These filter bags were placed in plastic bags and staged in an on-site container that housed K069 waste until it was disposed of off-site. Once all bags were removed, the building was then secured to minimize any dust escape in preparation for the next part

of its cleaning. Activities then continued on the top of the building with the vertical piping. Utilizing a manlift with safety harnesses, crew members cut the top portions of the pipe away. All material was then dampened and shoveled down by hand into the now empty second floor of the building. All piping was rinsed clean and left on top of the building. The roof and upper areas of both buildings were then pressure washed clean.

Work then continued in the interior of the structure. All waste that accumulated on the floor of the second level, was scraped and shoveled down into the bottom cells of the building through the holes left by the removed filter bags.

Once all contamination had been scraped from the floor, the interior of the entire building was scarified using abrasive blasting to remove the surface of the interior cinder block. The interior of the baghouse contained nine individual cells resulting in thirty-six separate cinder block surfaces. Each surface was sampled to determine if the abrasive blasting treatment was an effective treatment for the cinder block. Table 5-1 shows the laboratory results for the cinder block treatment. Any samples exhibiting greater than 5 mg/L TCLP lead or 1 mg/L TCLP cadmium resulted in retreatment of the entire wall section. Then another wall sample was analyzed. Abrasive blasting continued until all samples exhibited less than 5 mg/L TCLP lead and 1 mg/L TCLP cadmium. This treatment technology proved effective in removing the D008 and D006 toxicity characteristics and the K069 listing.

Following the interior abrasive treatment, the brick building exterior was hydro-blasted utilizing 3,200 p.s.i. water blasters. Table 5-2 shows the laboratory analysis for the ten exterior brick samples. Three samples (BRCK-02, BRCK-07, and BRCK-08) exhibited TCLP levels in excess of the 5 mg/L TCLP lead. Therefore, these sections of brick were retreated and analyzed until the brick did not exhibit the TCLP characteristics of 5 mg/L TCLP lead.

Laboratory reports from interior and exterior scarification decontamination verification are included in Appendix F. Upon completion, the top two baghouse stories were ready for demolition.

## Furnace Structure

Haphazard salvaging efforts left the furnace unit structurally unstable. Significant overhead piping, steel roof and wall sheeting, and mechanical apparatus were dangling in mid-air by rusted connections. The roof itself had several gaping openings. Extreme caution was exercised to ensure the health and safety of crew members.

Piles of gross contamination were abundant in the interior and exterior of the structure. Decontamination efforts began with these gross piles of contamination. Debris that was removable via a Bobcat machine was completed first. Areas were then cleaned by hand utilizing shovels or vacuum. Following the initial material removal, decontamination of the structure followed. Decontamination of the structure was executed as thoroughly as safety allowed. Decontamination activities utilized high pressure washers, extension wands, and lifting mechanisms to reach upper areas of the building and above ceiling and roof support beams.



Removing gross contamination from the furnace structure



Surplus chemicals stockpiled in furnace structure

The sequence of decontamination was from the top of the structure down with support crews on the floor containing and evacuating any effluent being generated by crew members working overhead. Resulting scrap metal from this structure was rinsed and visually inspected prior to off-site recycling.

The several furnaces, kettles, and tanks that were located inside of the furnace structure building also required decontamination. Any openings in the objects were sealed and wrapped with polyethylene sheeting. These items were then lowered onto their side for access. Gross residual contamination was first removed via hand shoveling and hand chisels. Once gross contamination was removed from the floor and sumps, the structure was decontaminated using high pressure water blasters. Decontamination water generated during these activities was directed with berms and a water vacuum boom. In addition, crew members on the ground directed water with squeegees and pumps. Collected water was used during treatment activities.

After successful decontamination, the items were placed in scrap boxes for off-site disposal.

### Roundhouse Building

The roundhouse building located in the northern portion of the site required extensive clean up operations before any decontamination efforts could begin. It contained significant amounts of miscellaneous trash, wood, metal, and other debris.

Decontamination efforts began with the removal of the wood and steel debris. This material was decontaminated utilizing hydro-blasters and sampled. A Bobcat



Removing general debris from roundhouse building

machine was used to move and stage this material for sampling followed by off-site disposal or recycling.

Upon removal of the wood and steel debris, vast amounts of oily sludge and trash still remained in piles on the floor located throughout the building. This material was condensed into a large stockpile and sampled. Due to the nature of this material, it was deemed unsuitable for treatment and was sent off site for disposal at a hazardous waste landfill.



Chemicals and drums in roundhouse building

Once the building was emptied of its contents, it was ready for final decontamination. However, because the roof of the structure was badly deteriorated in many areas, it first required repairs to help eliminate additional water from entering the structure. A roofing contractor was procured to patch areas where roofing material was absent. Once complete, the entire structure was decontaminated utilizing high pressure hydro-blasters, extension wands, and lifting mechanisms. Floor sumps located in the structure were used to collect and contain wash water.

## 5.2 Demolition Activities

All demolition activities during the Phase I TCRA began with careful planning and well organized strategies. These were based and designed around the health and safety of associates, work space, and general site/project efficiency. The plans included proper area preparation, proper equipment, and geographically logical staging areas to maximize working conditions.

Prior to any buildings being demolished, areas that were suspected of having any asbestos containing material, were assessed and abated. Demolition of a par-

ticular structure began with a meeting of all site crew members to discuss precisely how a building was to be demolished. This included discussing the task each associate was responsible for and their designated location during the course of the demolition. The meeting would also discuss mandatory hand-held radio role calls of each associate prior to commencement of demolition by the project manager. Any associate not involved in demolition were assigned a task away from heavy demolition areas.

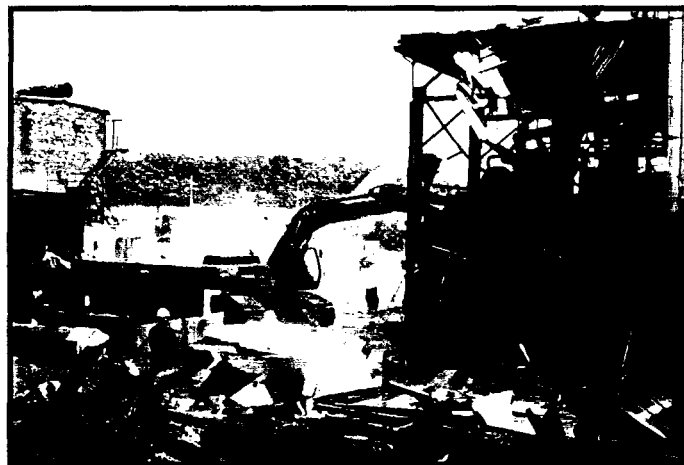
Upon completion of meetings and assurance that all associates understood their roles, areas undergoing demolition would be prepared by being cordoned off with caution tape. Any utilities that were obstructions or hazards were brought to the attention of equipment operators and work zone personnel. Upon final clearing of a structure via radio communication and radio role call by the project manager, demolition of a structure would begin.

During all demolition activities during Phase I Removal Actions, water misting procedures were implemented to minimize and control dust emissions. All resulting demolition debris was segregated and handled appropriately for recycling or disposal. Scrap metal was segregated for reclamation purposes.

### Demolition Areas Requiring Special Attention

Two structures required special attention during demolition activities were the brick baghouse building and the furnace structure. The brick baghouse building required special attention due to the nature and condition of the construction which included the following: the connected smokestack and vertical roof piping, the deteriorated nature of exterior brick and resurfacing material pro-

hibited close proximity, and that only two-thirds of the structure would first be demolished. The furnace structure required special attention because of its severely deteriorated condition and inconvenient location of two massive ball mill furnaces.



Dust control and demolition of furnace structure

### Brick Baghouse Building

Demolition of the brick baghouse buildings began with the removal of the vertical piping located on the roof of the two brick buildings. Upon successful decontamination of the pipe, a cut was made to disconnect the pipe between the two buildings. Utilizing an oxygen/acetylene cutting torch, cuts were made to the supports of the pipe to detach them from each roof. High strength cable was then secured to the piping and to the bucket of an on-site excavator which removed the pipes from the roofs of the structure. The pipes were sized and disposed of off-site.

Following the removal of the piping, the horizontal stack located between the buildings was removed. An



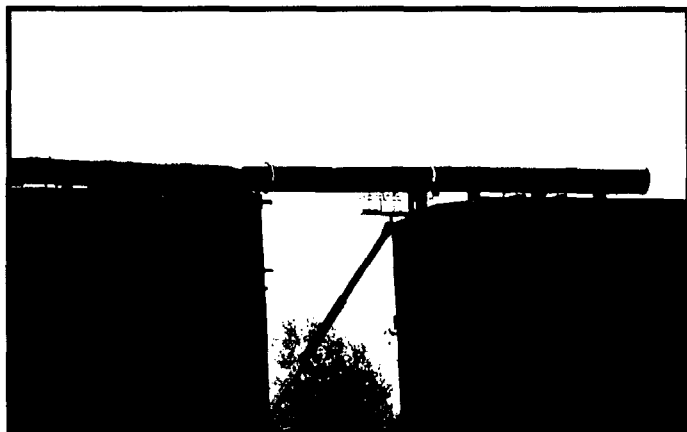
Demolition of baghouse building



Contaminant removal prior to demolition

access door was removed from the stack to inspect its inside. The stack was made only of steel, was clean, and was unlined. All steel support connections from the stack to the buildings and cat walks were cut utilizing an oxygen/acetylene torch. This left the stack free and clear from all buildings. A high pressure water spinner was then run through the top of the stack downward to moisten any potential dust in order to minimize emissions. Remaining steel support cables attached to the stack were removed; a cut was made to the base of the stack, and the stack was dropped to the ground. The stack was cut to size and disposed of off-site.

The area immediately surrounding the base of the brick baghouse structures were pressure washed and polyethylene sheeting was placed on the concrete slab to prevent cross contamination during demolition. The exterior and interior of each structure was wet down to help minimize dust emissions.



**Stack removal in preparation for demolition**

Demolition began on the western portion of the building under misting. Great care was taken to demolish only the top sections of the structure that had been previ-

ously abrasive blasted to remove the K069 material. Operations continued in this manner until only the bottom chamber of both brick baghouses remained. The resulting upper level debris was moved away from the bases and the lower chambers covered in polyethylene sheeting in preparation for off-site disposal.

### **Furnace Structure**

Due to the deteriorated condition of the furnace building, it was difficult to predict exactly how it would collapse. Prior haphazard scrapping efforts robbed the building of some of its supports. Additionally, long term open exposure to weather elements, had already begun to weaken other areas of the structure.

Demolition began with the southwest corner of the building and proceeded northward and east into the structure. Demolition was accomplished utilizing an 80,000 lbs. excavator. Misting was conducted via two hand-held valve controlled fire hoses and three misting units. This enabled misting from any direction to eliminate any off-site emissions.

Once the building was razed, all associated debris was cleared from the area to facilitate clean up and allow for space to drop the metal collection units. The metal dust collection units located on the east side of the structure were demolished under the same misting pattern. Pre-cuts were first made to the base of the dust collection units in order for them to collapse westward. ENTACT associates then shut down access to the west side of West Third Street. The excavator was then decontaminated and walked out onto Third Street. Once in position, the excavator knocked the collection units westward and into the site where they were then cut to size and disposed of off-site.

## 6.0 Removal of Hazardous Substances

Results of the waste characterization at the site revealed that hazardous materials on-site existed in various states of matter and containment. Solid media was stored in waste piles, roll-off boxes, drums, nylon pallet sacks, and trash bags. Liquid media on-site was primarily contained within the above-ground storage tanks and the numerous drums located in the roundhouse. Bulk containers of hazardous materials were also prevalent in the southwest corner of the site in addition to various other locations.

### 6.1 Solid Media

Material was primarily stored in drums and barrels, roll-off boxes, and waste piles. Also of concern during removal activities was the presence of asbestos containing material. The following sections briefly outline the removal activities associated with each of the waste units.

#### 6.1.1 Drummed Materials

The southwestern portion of the site contained large quantities of drummed solid media. After the treatability study determined which solid material in this area could be treated, the containerized materials were segregated based upon analytical characteristics. Material amenable to treatment was staged for processing, while materials that were characteristically hazardous and could not be treated were handled as hazardous waste and disposed of accordingly.



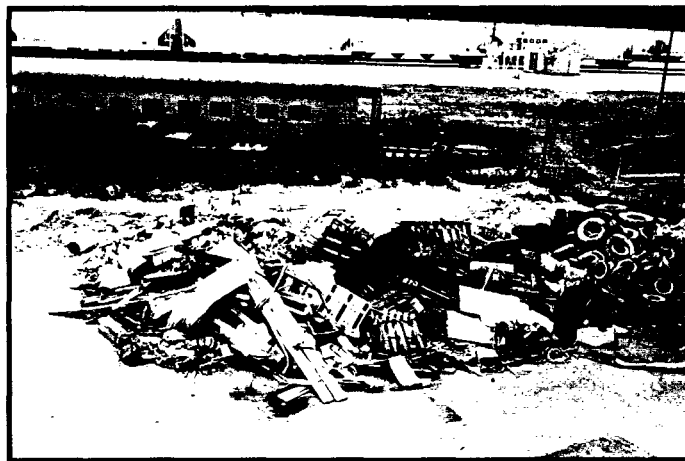
Removal of drummed chemicals

#### 6.1.2 Roll-off Boxes

Materials stored in roll-off boxes on site consisted of contaminated soil/gravel, leaded glass material, and china glazing by-product. After initial characterization and treatability analysis it was determined that these materials could be successfully treated on site. Materials were removed from the deteriorated metal boxes and staged in piles on polyethylene sheeting and covered while awaiting treatment.

#### 6.1.3 Waste Piles

The majority of the remainder of solid hazardous media on site was present in various sizes of exposed piles. Each of the twelve identified waste piles were characterized by laboratory analysis and were included in the



Wood debris pile prior to sampling



Waste pile preparation for treatment activities

treatability study. Waste piles determined to be similar in chemical characteristics based upon laboratory analysis were combined prior to treatability analysis. Waste piles amenable to ENTACT's treatment process were staged for subsequent treatment.

#### 6.1.4 Asbestos Containing Material (ACM)

There were several areas on-site where ACM was present. Figure 6-1 depicts the sampling locations utilized for the ACM removal on site. Through laboratory analysis ACM was identified in the roof tile material of the baghouse structure, roof debris piles from the white metals building, and loose roof material located east of the roundhouse near Third Street. ACM scattered throughout



Asbestos containing materials on site

the gravel area east of the roundhouse and the ACM debris piles from the white metals building were wetted, double bagged, and loaded into roll-off boxes for disposal. Non-friable roof material from the baghouse structure was wetted and loaded into a lined roll-off box during the demolition of the structure.

Browning-Ferris Industries of Cleveland, Ohio transported and disposed of the ACM at the Ottawa County Landfill in Port Clinton, Ohio. A total of approximately 21 tons of ACM were removed from the site. Appendix G contains laboratory analytical and certificates, licenses, etc. associated with the asbestos sampling and removal activities. Appendix O contains an example of the manifest form used to dispose of the ACM.

## 6.2 Liquid Wastes

Liquid waste materials were prevalent throughout the site. The majority of which were found in the round-

house structure where approximately fifty 55-gallon drums were stored. The above-ground storage tanks on site also contained a large quantity of non-aqueous liquid waste. The on-site sump network collected surface water runoff from the site and were loaded with hazardous sediment.

### 6.2.1 Drummed Liquids

Waste liquids in drums and barrels were profiled for recycling/disposal purposes. Additionally, field tests were performed to determine analytical parameters (e.g. pH, density checks, etc.). Analytical results indicated that the liquids had been impacted by lead contamination during site operations and the materials were disposed of as hazardous waste. EnviroServe transported the material via vacuum truck to Chemical Solvents Inc. for disposal.



Drummed liquid waste in roundhouse building

### 6.2.2 Above-Ground Storage Tanks

There were six above-ground storage tanks (ASTs) on site at the time of mobilization. These tanks were historically used to store and distribute the following petroleum products:

- diesel fuel
- gasoline
- hydraulic oil
- waste oil
- kerosene

Each of these tanks were profiled by laboratory analysis. Results are included in Appendix D.



**Dismantling of Above Ground Storage Tanks**

Flammable liquid (D001) was removed from the tanks and directed into 55-gallon drums for hazardous waste disposal. Non-hazardous, non-regulated liquids from the ASTs were removed and transported by EnviroServe and disposed of by Chemical Solvents, Inc. of Cleveland, Ohio. Appendix O contains an example of the manifest used for disposal of this material.

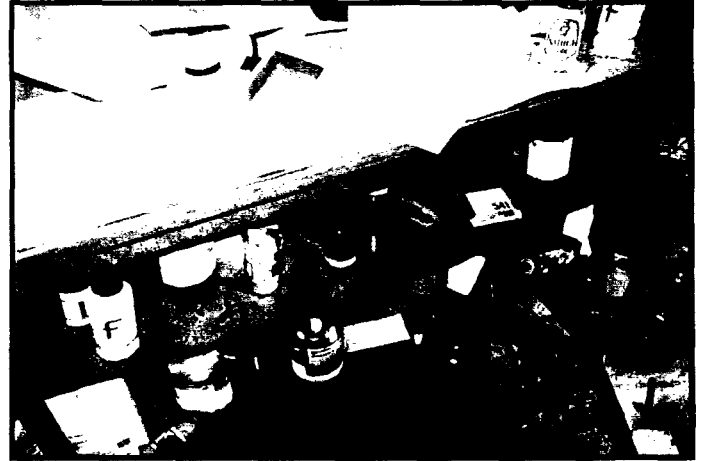
### **6.2.3 Sump Contaminant Removal**

Wastewater and sludge from each of the below grade sumps and catch basins was assumed to be hazardous based on common knowledge of the site. These materials were vacuumed into a transport truck by EnviroServe and disposed of by Chemical Solvents, Inc.

## **6.3 Laboratory Chemicals**

Laboratory chemicals were present in large quantities in two locations on site. In the roundhouse building one of the rooms contained approximately one hundred containers of various types of chemicals. Vandals and scavengers left these chemicals scattered throughout the room in disarray creating a dangerous environment. An ENTACT senior chemist was brought on-site to assist in stabilizing the situation. The chemicals were removed from the roundhouse structure and placed in a secure location within the adjacent office building where they were segregated according to compatibilities.

An additional laboratory was discovered in the office building which also contained an abundance of



**Laboratory chemicals upon mobilization**



**Segregated chemicals prior to lab pack and disposal**

chemicals. This laboratory had also been vandalized and the chemical containers present were scattered throughout the rooms and intermingled with miscellaneous trash and debris. These chemicals were segregated according to characteristics and properties in order to avoid any incompatibilities.

Laidlaw Environmental Services Inc. of Laurel, Maryland was employed to inventory and package the chemicals for disposal. Laidlaw technicians properly placed the chemicals into appropriate containers and labeled each per DOT regulations. The chemicals were transported to Laidlaw's facility in Maryland where the chemicals were segregated according to whether ultimate disposal was to be incineration, landfilling, or recycling. Appendix O contains an example manifest for the disposal of this material.

## 7.0 Excavation

One of the final steps towards completion of the TCRA involved excavating contaminated soil and gravel on-site. The overall removal priority for the site was to eliminate immediate threats to life and health; this same objective was applied to excavation activities. This objective resulted in the excavation of near surface on-site soils. Pursuant to the requirements of the approved work plan, ENTACT field crews excavated to a maximum depth of two (2) feet or until fill material (slag) was encountered.

### 7.1 Coordinate Grid System

A coordinate grid system (CGS) was established in the soil/gravel covered areas on-site in order to provide a coordinate system for tracking sampling and excavation activity during the removal action. The CGS consisted of square grids, where possible, of 25 feet by 25 feet superimposed over the areas to be excavated (Figure 7-1). This grid system was used for three purposes 1) to locate and identify samples; 2) to provide reference markers for excavation activities; and 3) to identify material types present as fill over the excavated area (i.e. slag, sand, sludge, etc).

### 7.2 Areas Requiring Excavation

Excavation of areas not covered by permanent structures began along the western border of the site. Pre-screening was conducted utilizing the XRF analyzer and the established XRF vs. TCLP correlation discussed in Section 7.4. This was the location of the railroad spur



Excavated area - Western border of site

entering the site in the southwest corner. Prior to commencing excavation, the steel rails were cut and removed. Excavation continued from the southwest corner northward between the fence line and the concrete pad until the roundhouse structure was reached. At this point excavation activities moved to the southeast corner of the site.

Nearest to the south entrance gate to the site was a large rectangular gravel area. In close proximity to this area was a small soil covered area between the brick access road and the concrete pad. Excavation in both these areas occurred to a depth of two (2) feet where fill sand was encountered. Figure 7-1 depicts the excavated areas and the coordinate grid system.

### 7.3 Excavation Verification and Extent of Contamination

Post-excavation sampling was performed to determine the nature and extent of contamination remaining after removing the top two (2) feet of surface material. Sample analysis included a combination of techniques including XRF field screening and laboratory analyses for heavy metals.

#### 7.3.1 XRF Field Screening Procedures

Site specific calibration standards (SSCS) were developed for the XRF analyzer by collecting soil samples from the site and surrounding area for laboratory analysis for total lead concentrations. These standards were utilized to calibrate the XRF prior to, during, and immediately after daily field screening activities. The analytical laboratory report for the SSCS can be found in Appendix I and the daily calibration sheets can be found in Appendix H.

After the initial calibration and standardization, the XRF unit was utilized to screen the excavated areas in the following manner. The location and sample ID were identified through the establishment of the coordinate grid system. XRF readings were collected directly from the ground surface where material moisture content allowed direct screening in place. For sample locations underwater or where moisture was visible in the material, a sample was collected in the field and dried in a controlled environment prior to screening.



**XRF Extent of Contamination (EOC) survey**

The XRF unit was utilized to collect three readings in each sampling grid (or from each of the three samples collected from a grid). These three readings were averaged to arrive at the total lead concentration assigned to the grid for the purposes of approximating the extent of contamination. Sample identification of XRF readings was achieved by using the x- and y-coordinates of the grid (Figure 7-1).

### **7.3.2 Laboratory Verification**

Verification samples were collected at a minimum frequency of 20% for laboratory analysis from grids where fill materials (i.e. slag, cinders, sludge, etc.) were not observed. Table 7-1 contains descriptions of materials contained within each grid. It should be noted that the description of each grid represents the majority of material in that grid.

Fifty grids were established for the grid system and approximately eleven of these grids were determined to contain native sand or gravel. Grid Z1 was predominately slag although it also contained significant amounts of sand. Note that grids AA1 and BB1 also contain large quantities of sand. Therefore, this sampling location was chosen for sample collection. Three samples were collected from these eleven grids by selecting the three highest XRF readings.

Verification samples were collected as grab samples to confirm XRF screening data. Each sample was submitted to Ross Analytical Services, Inc. for total lead, total cadmium, and total arsenic analysis. The average total lead concentration confirmed by laboratory analysis for the three grids was 12,970 mg/kg. Sample identification consisted of the letter E, the x- and y-coordinates of the grid along with the depth from grade in inches (e.g. E-CC-1-24). Sample results are provided in Table 7-2 and laboratory reports are included in Appendix H.

### **7.3.3 Extent of Contamination**

Table 7-1 contains the results from the XRF survey including grid location, XRF results, and material description. Results from this XRF survey indicated that even after removing the top two (2) feet of surficial material, significant lead concentrations were still present at depth. The average lead concentration remaining post-excavation is 7,550 mg/kg.

### **7.4 XRF vs. TCLP Correlation**

During the early stages of the removal action soil samples were collected to develop an XRF total lead vs. TCLP lead correlation. Ten samples were collected with XRF total lead concentrations ranging from 950 mg/kg to 57,400 mg/kg. These samples were then submitted to National Environmental Testing, Inc. in Bartlett, Illinois for total lead and TCLP lead analysis. The XRF vs. TCLP correlation indicated that an XRF reading of 995 mg/kg would approximately correlate to a TCLP lead value of 5.0 mg/L. Laboratory reports for the TCLP samples are included in Appendix I.

It was anticipated during the creation of the Workplan that this correlation factor would be used to segregate hazardous soils from nonhazardous soils during excavation. The implementation of the correlation factor as a screening measure was never realized because the concentrations of lead present in the excavated material were too high. All soils excavated during the removal action were determined to be hazardous and treated accordingly.

## 8.0 Treatment & Disposal

As discussed previously, disposal alternatives for materials on-site were prioritized according to ability to recycle, treat, and dispose. Materials that could be treated to non-hazardous characteristic levels prior to disposal were identified through a treatability study for the MMI Site. Results from this study were then utilized to develop a treatment strategy and additive ratio.

### 8.1 Treatability Study

ENTACT, Inc. conducted a bench scale treatability study for the Master Metals Technical Committee (MMTC) to obtain information from which to design a stabilization/solidification process for treating lead, cadmium, and arsenic contaminated feedstock and soils at the site. Based upon information collected during the removal activities, materials present on site contained as much as 155,000 mg/kg total lead. TCLP testing revealed some levels exceeding 2,000 mg/L. The stabilization/solidification process must reduce the leachability of lead, cadmium, and arsenic to nonhazardous levels.

In addition to rendering the materials nonhazardous by TCLP, ENTACT designed the treatability study to determine the optimum blend of additives which would achieve the treatability objectives. An important consideration in determining the optimum blend was the amount of additive that would successfully treat the on-site materials. Optimization of the additive quantities in the blend reduced the total amount of additives needed for the project. This minimization of additives also helped to prevent a significant volume increase in the treated material. A substantial cost savings resulted from utilizing a minimum amount of additive. The reduction in volume of treated material reduced handling costs as well as disposal and containment costs.

#### 8.1.1 Characterization

In July and August 1997, ENTACT collected twelve sample containers containing representative samples of materials from the Master Metals Site. Samples were collected from the on-site soils, drummed waste and feedstock materials. The waste streams found on site include the following:

- gross contamination removed from the concrete slab during remediation activities
- refractory brick and debris drummed on site
- soil contained in roll off boxes
- material originating from furnaces and ball mills
- white lead waste from drums and supersacks in feedstock area
- gray lead powder waste from supersacks in feedstock area
- leaded glass in pallet containers and roll off boxes
- large gray waste pile near furnace building
- excavated soils from western and southern portions of site
- sample material received on site prior to refining
- by-products of glazing process (roll off boxes)
- drummed solid waste material

Representative samples of these materials were taken to National Environmental Testing Laboratories (NET), of Bartlett, Illinois, for treatability analysis.

Because waste materials at the site were heterogeneous, they were analyzed as separate waste streams and treated as such. Tests were conducted to determine the total metals concentration and TCLP metals on one composite sample from each waste stream. These tests established baseline conditions against which treatment additives were evaluated. The test results are provided in Table 8-1.

Total metal concentrations for lead ranged from 12,000 mg/kg to 155,000 mg/kg. As shown in Table 8-1, all materials exhibited the toxicity characteristic for lead. TCLP concentrations for lead ranged from 42.8 mg/L to 2,180 mg/L. Nine of the thirteen waste streams exhibited

the toxicity characteristic for cadmium. TCLP concentrations for cadmium ranged from less than 0.1 mg/L to 75.3 mg/L. Three of the thirteen waste streams exhibited the toxicity characteristic for arsenic. TCLP concentrations for arsenic ranged from 0.023 mg/L to 15.1 mg/L.

### 8.1.2 Treatability Sample Analysis

Thirteen samples, representing the waste streams present, were prepared for treatability testing. The percentages of the additive components used in the blend were varied for several trials. The additive blend varied from two percent to ten percent based upon the matrix characteristics. This relatively wide range of additive mixtures is due in part to the heterogeneous nature of materials present on site. Results from this initial treatability study indicated that some waste streams required the addition of cement along with the phosphate-based additive. These materials were treated with blends of 5% phosphate-5% cement; and 5% phosphate-10% cement.

The treatability tests showed that the leachability of the metals in the treated matrix could be reduced to nonhazardous levels with the appropriate blend of proprietary additives. TCLP tests measured the leachability of lead, cadmium, and arsenic from the matrix following treatment.

Each of the samples was initially treated with an additive blend mixture of two (2) percent and analyzed. This mixture was increased in increments of two percent (e.g. 4%, 6%, etc.), or a blend of cement/phosphate was utilized until the matrix exhibited significant reductions in leachability (> 95%). The samples were tested for TCLP metals. The results of these tests are provided in Table 8-2.

Two of the waste streams (SDY-05, grey powder, and SDY-10, 2 gallon sample buckets) were difficult to treat. The leachability was not significantly reduced. Therefore, a decision was made to treat these two waste streams off-site. These materials were consolidated into roll-off boxes and disposed of as hazardous waste at a Subtitle C landfill.

ENTACT's selected blends of additives were successful in stabilizing the lead contaminated materials in eleven of the thirteen waste streams present at the Master Metals Site. Eight of the waste streams were treated successfully with a phosphate treatability of 6-8%. Only three or four waste streams required a treatability blend of

phosphate/cement. The average TCLP level for lead was reduced from approximately 922 mg/L to about 3 mg/L, a reduction of more than 99.6%. A similar reduction in TCLP levels for cadmium (98.1%) and arsenic developed from the addition of the cement to the treatability samples. Laboratory analytical from the treatability study is included in Appendix J.

### 8.2 Material Consolidation

Based upon total metals results and the treatability study, materials on-site with similar lead concentrations and identical treatment ratios were mixed prior to treatment to consolidate waste streams and provide effective processing of the waste materials and treatability reagents. The ability to composite waste streams such as soil and glass resulted in a matrix that was much more receptive of the treatment reagents.

Materials exhibiting arsenic and/or cadmium toxicity characteristics were not consolidated with other materials exhibiting only the lead toxicity characteristic. This was imperative so as not to create an arsenic or cadmium toxicity characteristic in a matrix which heretofore had been only characteristic for lead toxicity. After consolidation stockpiled material was ready for treatment operations.

### 8.3 Stabilization Operations

The stabilization process, sometimes referred to as immobilization or fixation, uses additives to chemically immobilize the hazardous constituents of a contaminated material by combining the additives and lead-bearing matrix within a mixing device. Additive reagents for use in the stabilization of lead contaminated materials include Portland Cement, calcium oxide, calcium carbonate, fly ash, and proprietary additives.

ENTACT has developed a proprietary list of additives for stabilizing waste containing lead and other heavy metals including phosphoric acid, monocalcium phosphate (TSP), monoammonium phosphate, and diammonium phosphate either alone or in combination with Portland Cement.

The listed ENTACT patented compounds provide the necessary environment for successful lead stabilization. The first component is a phosphate ion that reacts with metals such as lead to form a salt which is insoluble

under normal environmental conditions. The second component is the phosphoric acid buffer system that provides stability to the treated waste mixture under minor environmental changes.

The stabilization process and ENTACT patented additives provide the necessary components for successful stabilization of lead contaminated soil and debris—small and consistent particle size, a phosphate ion, a buffering system, and thorough mixing.

### 8.3.1 Crushing

Particle size reduction was achieved by utilizing a concrete processor for on-site materials larger than six (6) inches in diameter. Stockpiled material amenable to treatment was loaded directly into the hopper located on the rear of the crushing unit. This hopper and belt feeder also served as a segregation process in that metal debris and solid lead material could be removed at this stage and containerized for recycling.



**Crushing unit for treatment**

Wood, plastic and other general debris were also removed during this process in order to minimize down time during the treatment process. The concrete processor was instrumental in reducing debris such as concrete, brick, glass and slag to particle sizes more amenable to the treatment process. Material processed by the crushing unit was fed directly via a conveyor to the treatment unit for additive and mixing.

### 8.3.2 Treatment

The treatment unit on-site received pulverized material from the concrete processor as well as fine grained material loaded directly into the treatment unit hopper. This fine grained material which did not require crushing consisted primarily of excavated soil and drummed powder-like material.

Material loaded into the hopper passed through a hammer mill and up a conveyor belt. Treatment reagent was added to the material prior to the material entering the pug mill section of the treatment unit. It is in this enclosed pug mill section that further particle size reduction and mixing were performed.



**Entire treatment system established on-site**

A treatment containment unit was utilized for the addition of a cement treatment reagent to materials requiring stabilization of the cadmium and arsenic characteristics. Mixing and treatment of the lead characteristics for these materials occurred in the enclosed portion of the treatment processing unit.

### 8.3.3 Material Transport and Containment

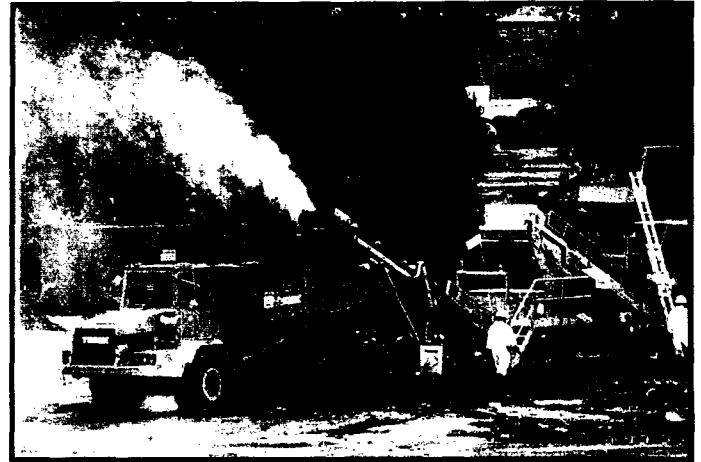
Treated material exiting the pug mill was transported by conveyor to a 15 cubic yard dump truck. This truck was utilized to transport the treated material from the treatment unit to the tank containment unit on-site. This tank containment unit was constructed during treatment preparation activities to store treated material pending analytical verification.

The existing concrete walls from the on-site tank farm were utilized as a portion of the tank containment unit. The tank unit was constructed directly outward from these concrete walls and covered an area of approximately 4,000 square feet. After constructing sidewalls for the tank unit, the underlying concrete pad was sealed with a spraying unit and a water-based concrete sealer. The final step in constructing the tank unit was to line the entire bottom and sides of the unit with 6 mil polyethylene sheeting.

#### 8.4 Treatment Verification

Analytical verification of treated soil and solid media was performed at a frequency of one TCLP grab sample per 200 cubic yards of treated material. The laboratory parameters for treatment verification were TCLP lead, TCLP cadmium, and TCLP arsenic. Material transported from the treatment area and stored in the tank containment unit was stockpiled in 200 cubic yard piles for sampling.

Samples were collected by retrieving a sufficient amount of soil with a clean stainless steel trowel, homogenizing this soil in a clean stainless steel bowl and then placing the soil sample into a properly labeled glass sample container supplied by the laboratory. Sampling nomenclature for treatment verification included the prefix TS along with a number to indicate the sequential sample number (i.e. TS-01, TS-02, ...). TCLP samples were submitted to Ross Analytical Services, Inc. in Strongsville, Ohio for analysis. Arrangements were made with Ross Analytical to turn around soil TCLP samples within 36 hours of sample submission. This allowed for more efficient treatment operations in that treated batches could be quickly retreated if necessary; and, also allowed disposal to be performed soon after treatment was complete which reduced the need to store large quantities of treated soil for long periods of time. Treatment verification analytical results are tabulated in Table 8-4-1 and laboratory reports are included in Appendix K.



Transportation of treated material

#### 8.5 Transportation and Disposal

Browning-Ferris Industries was employed to provide transportation and disposal services for treated soil and solid media. Analytical verification results were provided for each shipment to be transported to the BFI Ottawa County Landfill in Port Clinton, Ohio.

After treatment confirmation, material was loaded from the tank containment unit directly into semi-tractor trailers with tarp covers. Material shipments were weighed prior to final placement at the landfill and a total of approximately 4,300 tons of treated soil were ultimately disposed of as non-hazardous special waste. Waste manifests for the MMI Site are stored in ENTACT's file repository in Wood Dale, Illinois.

## 9.0 Site Restoration

On October 7, 1997, ENTACT petitioned EPA for a modification to the work objectives identified in the Phase I workplan ( see correspondence to Mr. Thomas Alcamo of the U.S. EPA, Region 5 entitled "Field Modification to Phase I Time-Critical Removal Work Plan for the Master Metals Site") (Appendix L) and were verbally agreed to on the same day. The following sections outline the actions taken in accordance with this Field Modification Request during site restoration activities.

### 9.1 Backfill

Following excavation of soil/gravel covered areas, an outside backfill source was located to provide the type of clean backfill and volumes required for partial site restoration.

#### 9.1.1 Backfill Location Sampling

Once identified, the location was visited for the purposes of collecting a sample for laboratory analysis. The location chosen was Lafarge Corporation in Shalersville, Ohio. Lafarge Corp. operates a large sand and gravel pit approximately 30-40 miles southeast of the site. The collected sample was submitted to Ross Analytical Services, Inc. in Strongsville, Ohio for laboratory analysis of the following parameters:

-total metals

- arsenic
- barium
- cadmium
- chromium
- lead
- selenium
- silver
- mercury

-soil pH

- total petroleum hydrocarbons  
-pesticides

Sample nomenclature for backfill material consisted of the prefix BF with a sequential sample number (i.e. BF-01, BF-02, ...). Results from the laboratory analysis are included in Appendix M. Concentrations for each of the parameters were required to be below background levels in order to be considered an acceptable source. Fill sand from the Lafarge sand/gravel pit was approved for restoration activities for the Site.

#### 9.1.2 Temporary Barrier Installation

After completion of excavation activities associated with the Time-Critical Removal Action, the open excavation area was covered with 6 mil polyethylene over all exposed areas and overlapped 2 feet between adjoining sheets. This temporary barrier was employed to separate the remaining lead contamination residing in the underlying slag fill from the clean fill sand utilized as backfill over the polyethylene sheeting.

#### 9.1.3 Fill Sand Placement

Upon completing the barrier installation, fill sand was imported from Lafarge Corporation in Shalersville, Ohio. This fill sand was placed in a 6 inch layer to cover the polyethylene sheeting. This combination of barriers has eliminated the lead inhalation and ingestion pathways while still allowing reasonable access to the underlying materials if further excavation is deemed necessary during a later phase in the site remediation process.



Backfill over temporary barrier

### 9.2 Final Site Contaminant Removal

Activities associated with the removal action culminated with final contaminant removal from the concrete pad and foundations. Final cleaning operations at the site were performed with hydraulically and mechanically driven sweepers aided by misting units and fire hose. Sludge and water from cleaning activities were collected

and disposed of as characteristic hazardous waste by EnviroServe of Cleveland, Ohio at Chemical Solvents, Inc. also of Cleveland, Ohio.

### 9.3 Long-Term Site Security

ENTACT crew members repaired numerous sections of the perimeter fence prior to full demobilization. These sections were areas where trespassers and animals could gain access to the site. Portions of chain link fence from the roundhouse structure were used to patch holes and gaps between sections of the fence. The entrance gate located in the southeastern corner of the site was replaced with a taller gate that had been used

in the roundhouse. Final fence repair activities consisted of securing sections of the fence that were leaning or unstable.

In addition to reestablishing the integrity of the perimeter fence, ENTACT crews took other steps to prevent accidents or injuries from occurring to unauthorized visitors. The office building, although purged of general trash and debris, still posed a minor hazard to vagrants. To allay this hazard, the exterior of the structure was surrounded with a temporary barrier to help prevent entry. Open excavation areas and below grade sumps were also a concern on site. To address these areas, snow fence and caution tape were used to provide a visual indicator of the hazards present.

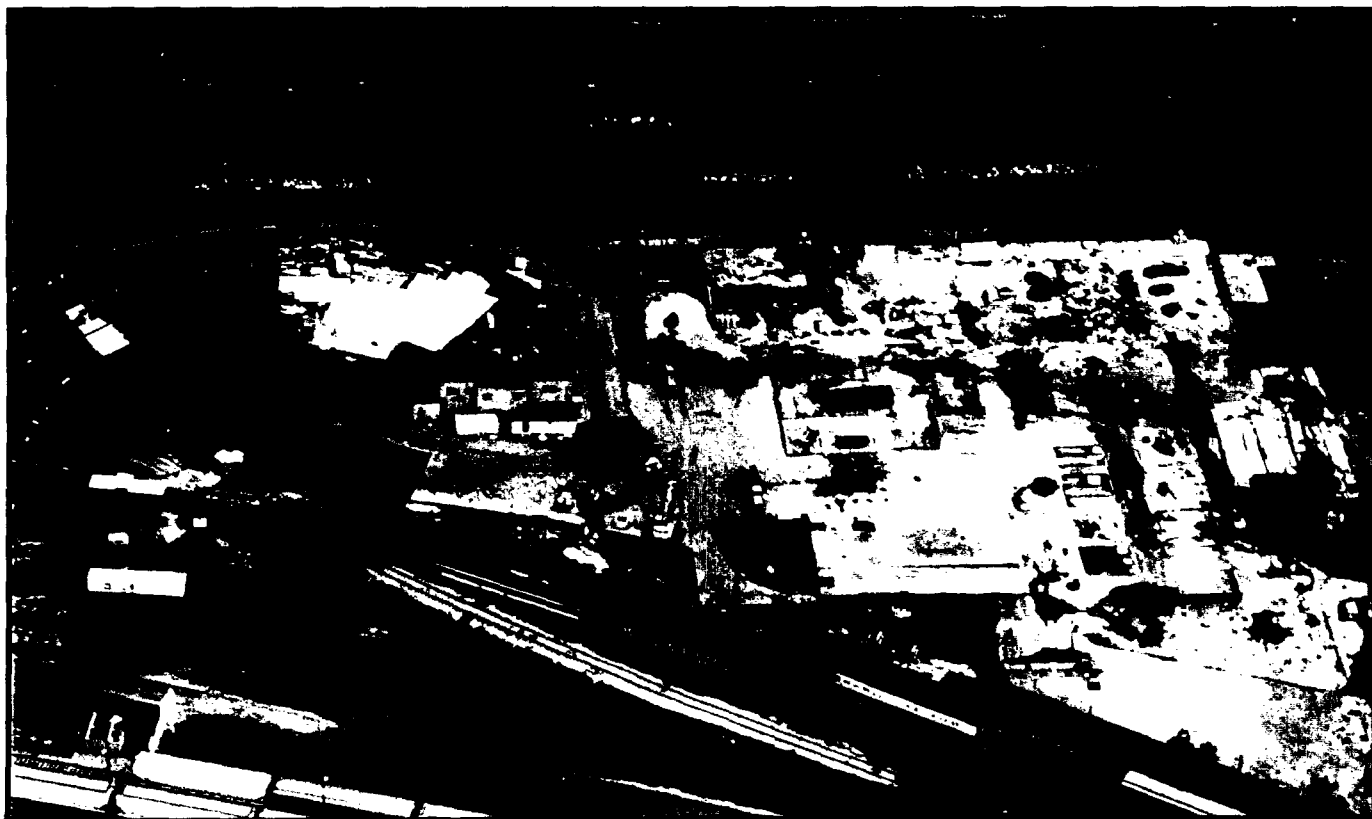
## 10.0 Conclusion

Prior to June of 1997, the Master Metals, Inc. property was an abandoned 4 acre plot of land that consisted of several severely deteriorated buildings; open pits and sumps; piles of exposed gross contamination; and open barrels, drums, and tanks containing hazardous materials. Above-ground storage tanks still contained flammable liquids and dozens of 55-gallon drums containing oils and corrosives were scattered throughout the site. Other hazardous materials on-site included a listed hazardous waste, K069 as well as a few hundred bottled laboratory chemicals.

Site remedial activities focused on the immediate removal of exposed contaminants in order to greatly reduce the potential for inhalation or ingestion of airborne hazardous materials. Performance of all activities occurred with the health and safety of the surrounding residents and ENTACT associates in full consideration. Engineering controls for dust emissions and stormwater management were instituted at the site and were successful in controlling off-site migration of contaminants.

By November of 1997, current structures on site consisted only of the two-story office building and the roundhouse structure. All aforementioned contamination had been properly disposed and all on-site hazardous material removed, managed, and/or treated, including the top two feet of contaminated soil/gravel present on site. All other site buildings had been demolished and recycled for reclamation purposes. The concrete pad was left in a decontaminated state.

All objectives specified in the Phase I Time-Critical Removal Action Workplan for the Master Metals Site were successfully completed by ENTACT. The project was executed in a health and safety oriented, time effective, and quality conscious manner, while simultaneously achieving site goals. ENTACT's execution of this removal action has been completed in full compliance with the issued administrative order and all activities were conducted in a manner which has provided for a safe, efficient and effective remedial solution.



Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
6/16/97					0.08 0.1 rain rain
6/17/97					- - -
					TWA 0.09
6/18/97	HV-001	C157-1	56.1	1.2	rain
	HV-002	C157-2	45.5	0.16	rain
	HV-003	C157-3	17.3	< 0.15	rain
	HV-004	C157-4	43.6	< 0.15	rain
6/19/97	HV-005	C157-1	101	0.98	-
	HV-006	C157-2	100	4.1	-
	HV-007	C157-3	108	0.49	-
	HV-008	C157-4	53.3	< 0.15	TWA 0.12
6/20/97	HV-009	C157-1			-
	HV-010	C157-2			-
	HV-011	C157-3			-
	HV-012	C157-4			TWA 0.10
6/21/97	HV-013	C157-1	75	2.4	-
	HV-014	C157-2	99.7	0.48	-
	HV-015	C157-3	30.5	< 0.15	-
	HV-016	C157-4	73.7	1.6	-
6/23/97	HV-017	C157-1	75.7	0.38	0.07
	HV-018	C157-2	59.2	0.18	0.09
	HV-019	C157-3	38.4	1.9	-
	HV-020	C157-4	130	31	TWA 0.09
6/24/97	HV-021	C157-1	61.5	2.2	0.03
	HV-022	C157-2	56.8	0.16	0.08
	HV-023	C157-3	34.1	0.48	0.07
	HV-024	C157-4	88.7	12	TWA 0.06
6/25/97	HV-025	C157-1			-
	HV-026	C157-2			-
	HV-027	C157-3			-
	HV-028	C157-4			TWA 0.11
6/26/97	HV-029	C157-1			0.09
	HV-030	C157-2			0.08
	HV-031	C157-3			0.1
	HV-032	C157-4			TWA 0.09
6/27/97	HV-033	C157-1			-
	HV-034	C157-2			-

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
6/30/97	HV-035	C157-3			-
	HV-036	C157-4			TWA 0.08
	HV-037	C157-1			0.08
	HV-038	C157-2			0.07
	HV-039	C157-3			0.12
7/1/97	HV-040	C157-4			TWA 0.09
	HV-041	C157-1	63.2	0.97	0.03
	HV-042	C157-2	49.7	1.9	0.09
	HV-043	C157-3	55.4	0.87	0.05
	HV-044	C157-4	66.8	1.6	TWA 0.08
7/2/97	HV-045	C157-1			0.09
	HV-046	C157-2			0.08
	HV-047	C157-3			-
	HV-048	C157-4			TWA 0.10
	HV-049	C157-1			0.04
7/7/97	HV-050	C157-2			0.07
	HV-051	C157-3			0.09
	HV-052	C157-4			TWA 0.09
	HV-053	C157-1			0.05
	HV-054	C157-2			0.13
7/8/97	HV-055	C157-3			0.09
	HV-056	C157-4			TWA 0.10
	HV-057	C157-1	49.1	0.36	0.02
	HV-058	C157-2	41.5	0.52	0.04
	HV-059	C157-3	44.1	0.99	0.06
7/9/97	HV-060	C157-4	55.1	0.78	TWA 0.08
	HV-061	C157-1			0.04
	HV-062	C157-2			0.02
	HV-063	C157-3			-
	HV-064	C157-4			TWA 0.04
7/10/97	HV-065	C157-1			0.03
	HV-066	C157-2			0.1
	HV-067	C157-3			-
	HV-068	C157-4			TWA 0.04
	HV-069	C157-1			-
7/11/97	HV-070	C157-2			-
	HV-071	C157-3			-
	HV-072	C157-4			-
	HV-073	C157-1			0.09
	HV-074	C157-2			0.12
7/12/97	HV-075	C157-3			rain
	HV-076	C157-4			rain
	HV-077	C157-1	61.2	0.53	0.1
	HV-078	C157-2	48.9	< 0.15	-

TABLE 3-1  
PM10 and MiniRAM Air Data

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
7/16/97	HV-079	C157-3	50.2	1.5	-
	HV-080	C157-4	60.2	2.4	TWA 0.11
	HV-081	C157-1			0.08
	HV-082	C157-2			0.04
	HV-083	C157-3			0.11
7/17/97	HV-084	C157-4			TWA 0.10
	HV-085	C157-1			0.06
	HV-086	C157-2			0.03
	HV-087	C157-3			-
	HV-088	C157-4			TWA 0.04
7/18/97	HV-089	C157-1			0.08
	HV-090	C157-2			0.03
	HV-091	C157-3			0.05
	HV-092	C157-4			TWA 0.04
7/20/97	BSLN-1	C157-1	51.4	< 0.15	
	BSLN-2	C157-2	39.6	0.28	
	BSLN-3	C157-3	35.8	0.5	
	BSLN-4	C157-4	48.2	0.45	
7/21/97	HV-093	C157-1			0.06
	HV-094	C157-2			0.08
	HV-095	C157-3			
	HV-096	C157-4			TWA 0.05
7/22/97	HV-097	C157-1	49.9	0.63	0.09
	HV-098	C157-2	41.5	0.59	-
	HV-099	C157-3	53.6	3.1	0.06
	HV-100	C157-4	58.9	0.94	TWA 0.08
7/23/97	HV-101	C157-1			0.09
	HV-102	C157-2			0.08
	HV-103	C157-3			-
	HV-104	C157-4			TWA 0.08
7/24/97	HV-105	C157-1			0.03
	HV-106	C157-2			0.02
	HV-107	C157-3			-
	HV-108	C157-4			TWA 0.04
7/25/97	HV-109	C157-1			0.12
	HV-110	C157-2			0.03
	HV-111	C157-3			-
	HV-112	C157-4			TWA 0.06
7/27/97	HV-113	C157-1	34.3	< 0.15	
	HV-114	C157-2	28.1	< 0.15	
	HV-115	C157-3	39.8	0.19	
	HV-116	C157-4	31.7	< 0.15	
7/28/97	HV-117	C157-1	34.3	0.28	0.05
	HV-118	C157-2	23	0.34	0.08

TABLE 3-1  
PM10 and MiniRAM Air Data

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
7/29/97	HV-119	C157-3	32.4	3.4	rain
	HV-120	C157-4	30	1.3	rain
	HV-121	C157-1			0
	HV-122	C157-2			0.02
	HV-123	C157-3			-
7/30/97	HV-124	C157-4			TWA 0.02
	HV-125	C157-1			0.09
	HV-126	C157-2			0.03
	HV-127	C157-3			-
	HV-128	C157-4			TWA 0.08
7/31/97	HV-129	C157-1	66.3	0.52	0.02
	HV-130	C157-2	77.9	0.68	0.08
	HV-131	C157-3		< 120 ug/filter	0.03
8/1/97	HV-132	C157-4	61	1.2	TWA 0.05
	HV-133	C157-1			0.03
	HV-134	C157-2			0.07
	HV-135	C157-3			0.09
	HV-136	C157-4			TWA 0.08
8/4/97	HV-137	C157-1			0.09
	HV-138	C157-2			0.02
	HV-139	C157-3			0.03
	HV-140	C157-4			TWA 0.05
	HV-141	C157-1			0.02
8/5/97	HV-142	C157-2			0.03
	HV-143	C157-3			-
	HV-144	C157-4			TWA 0.03
	HV-145	C157-1	50.6	0.22	0.06
	HV-146	C157-2	45.1	0.46	0.04
8/6/97	HV-147	C157-3	44.6	1.5	0.02
	HV-148	C157-4	43.6	0.93	TWA 0.04
	HV-149	C157-1			0.05
	HV-150	C157-2			0.02
	HV-151	C157-3			-
8/7/97	HV-152	C157-4			TWA 0.04
	HV-153	C157-1			0.1
	HV-154	C157-2			0.01
	HV-155	C157-3			-
	HV-156	C157-4			TWA 0.07
8/8/97	HV-157	C157-1			0.09
	HV-158	C157-2			0.03
	HV-159	C157-3			rain
	HV-160	C157-4			rain
8/11/97	HV-161	C157-1			0
	HV-162	C157-2			0.07

TABLE 3-1  
PM10 and MiniRAM Air Data

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
	HV-163	C157-3			0.05
	HV-164	C157-4			TWA 0.03
8/13/97	HV-165	C157-1	50.4	< 0.15	-
	HV-166	C157-2	40	< 0.15	-
	HV-167	C157-3	43	0.85	-
	HV-168	C157-4	43.6	0.18	-
8/14/97	HV-169	C157-1			0.05
	HV-170	C157-2			0.07
	HV-171	C157-3			0.03
	HV-172	C157-4			TWA 0.04
8/15/97	HV-173	C157-1			0.08
	HV-174	C157-2			rain
	HV-175	C157-3			rain
	HV-176	C157-4			rain
8/18/97	HV-177	C157-1	19.4	<0.15	0.03
	HV-178	C157-2	18.6	0.66	0.05
	HV-179	C157-3	23.2	0.4	0.07
	HV-180	C157-4	21.8	0.18	TWA 0.03
8/19/97	HV-181	C157-1	45.8	0.69	0.09
	HV-182	C157-2	2	0.9	0.03
	HV-183	C157-3	31.2	1.1	-
	HV-184	C157-4	31	0.56	TWA 0.06
8/20/97	HV-185	C157-1			0.12
	HV-186	C157-2			0.04
	HV-187	C157-3			rain
	HV-188	C157-4			rain
8/21/97	HV-189	C157-1	26.1	0.21	0.09
	HV-190	C157-2	15.9	<0.15	rain
	HV-191	C157-3	22.2	<0.15	rain
	HV-192	C157-4	18.5	0.29	rain
8/22/97	HV-193	C157-1	7	<0.15	rain
	HV-194	C157-2	18.5	<0.15	rain
	HV-195	C157-3	7	<0.15	rain
	HV-196	C157-4	10	<0.15	rain
8/25/97	HV-197	C157-1	73.6	0.45	0
	HV-198	C157-2	64.7	0.32	0.03
	HV-199	C157-3	67.4	0.21	0.07
	HV-200	C157-4	60.4	0.2	TWA 0.03
8/26/97	HV-201	C157-1			0.18 *
	HV-202	C157-2			0.26 *
	HV-203	C157-3			0.03
	HV-204	C157-4			TWA 0.10
8/27/97	HV-205	C157-1			0.08
	HV-206	C157-2			0.03

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
8/28/97	HV-207	C157-3			-
	HV-208	C157-4			TWA 0.05
	HV-209	C157-1			0.04
	HV-210	C157-2			0.06
	HV-211	C157-3			-
8/29/97	HV-212	C157-4			TWA 0.03
	HV-213	C157-1			0.01
	HV-214	C157-2			0.005
	HV-215	C157-3			-
	HV-216	C157-4			TWA 0.01
9/2/97	HV-217	C157-1			0.09
	HV-218	C157-2			0.12
	HV-219	C157-3			-
	HV-220	C157-4			TWA 0.08
9/3/97	HV-221	C157-1	34.8	0.53	0.04
	HV-222	C157-2	33	0.95	rain
	HV-223	C157-3	29	1.4	rain
	HV-224	C157-4	29.3	0.68	rain
9/4/97	HV-225	C157-1			0.08
	HV-226	C157-2			0.05
	HV-227	C157-3			0.04
	HV-228	C157-4			TWA 0.04
9/5/97	HV-229	C157-1			0.06
	HV-230	C157-2			0.07
	HV-231	C157-3			0.03
	HV-232	C157-4			TWA 0.05
9/8/97	HV-233	C157-1			0.09
	HV-234	C157-2			0.08
	HV-235	C157-3			0.1
	HV-236	C157-4			TWA 0.09
9/9/97	HV-237	C157-1			0.08
	HV-238	C157-2			0.21
	HV-239	C157-3			-
	HV-240	C157-4			TWA 0.13
9/10/97	HV-241	C157-1	45.6	0.57	0.04
	HV-242	C157-2	33.4	< 0.15	0.02
	HV-243	C157-3	49.4	1.8	0.08
	HV-244	C157-4	42	0.66	TWA 0.05
9/11/97	HV-245	C157-1			0.03
	HV-246	C157-2			0.09
	HV-247	C157-3			0.06
	HV-248	C157-4			TWA 0.07
9/12/97	HV-249	C157-1			0.09
	HV-250	C157-2			0.07

TABLE 3-1  
PM10 and MiniRAM Air Data

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
9/15/97	HV-251	C157-3			0.03
	HV-252	C157-4			TWA .06
	HV-253	C157-1			0.06
	HV-254	C157-2			0.15
	HV-255	C157-3			-
9/16/97	HV-256	C157-4			TWA 0.11
	HV-257	C157-1	105	1.8	0.03
	HV-258	C157-2	77.1	0.31	0.04
	HV-259	C157-3	90.3	0.99	0.01
	HV-260	C157-4	108	1.7	TWA 0.03
9/17/97	HV-261	C157-1			0.08
	HV-262	C157-2			0.03
	HV-263	C157-3			rain
	HV-264	C157-4			rain
	HV-265	C157-1			0.06
9/18/97	HV-266	C157-2			0.12
	HV-267	C157-3			-
	HV-268	C157-4			TWA 0.08
	HV-269	C157-1			0.07
	HV-270	C157-2			0.21
9/19/97	HV-271	C157-3			-
	HV-272	C157-4			TWA 0.14
	HV-273	C157-1	46.4	0.55	0.06
	HV-274	C157-2	33.5	1.8	0.03
	HV-275	C157-3	49	1.8	-
9/22/97	HV-276	C157-4	26.4	0.5	TWA 0.04
	HV-277	C157-1			rain
	HV-278	C157-2			rain
	HV-279	C157-3			0.05
	HV-280	C157-4			TWA 0.03
9/23/97	HV-281	C157-1			0.07
	HV-282	C157-2			-
	HV-283	C157-3			0.02
	HV-284	C157-4			TWA 0.05
	HV-285	C157-1			0.1
9/24/97	HV-286	C157-2			-
	HV-287	C157-3			0.03
	HV-288	C157-4			TWA 0.05
	HV-289	C157-1			0.07
	HV-290	C157-2			-
9/25/97	HV-291	C157-3			0.02
	HV-292	C157-4			TWA 0.04
	HV-293	C157-1			0.06
	HV-294	C157-2			0.04

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
9/30/97	HV-295	C157-3			-
	HV-296	C157-4			TWA 0.03
	HV-297	C157-1			rain
	HV-298	C157-2			rain
	HV-299	C157-3			rain
10/1/97	HV-300	C157-4			rain
	HV-301	C157-1	59.9	1.2	0.03
	HV-302	C157-2	43.4	0.57	0.05
	HV-303	C157-3	47.2	0.83	-
	HV-304	C157-4	67	0.83	TWA 0.03
10/2/97	HV-305	C157-1			0.06
	HV-306	C157-2			0.08
	HV-307	C157-3			-
	HV-308	C157-4			TWA 0.05
	HV-309	C157-1			0.08
10/3/97	HV-310	C157-2			0.05
	HV-311	C157-3			-
	HV-312	C157-4			TWA 0.09
	HV-313	C157-1			0.02
	HV-314	C157-2			0.04
10/6/97	HV-315	C157-3			0.08
	HV-316	C157-4			TWA 0.03
	HV-317	C157-1			0.08
	HV-318	C157-2			0.06
	HV-319	C157-3			-
10/7/97	HV-320	C157-4			TWA 0.06
	HV-321	C157-1			0.1
	HV-322	C157-2			0.04
	HV-323	C157-3			0.03
	HV-324	C157-4			TWA 0.07
10/8/97	HV-325	C157-1			0.12
	HV-326	C157-2			0.08
	HV-327	C157-3			-
	HV-328	C157-4			TWA 0.11
	HV-329	C157-1	35.3	< 0.15	0.09
10/9/97	HV-330	C157-2	25.9	0.41	0.06
	HV-331	C157-3	34.1	1.3	0.02
	HV-332	C157-4	50.3	3.1	TWA 0.07
					0.16
					0.17
10/10/97					0.15
					TWA 0.17
	HV-333	C157-1			0.1
	HV-334	C157-2			0.02

**From:** ALFONS WINKLHOFFER  
**To:** R5AIR.R5ARD.SUMMERHAYS-JOHN  
**Date:** 12/2/98 9:03am  
**Subject:** Lead Violations near Master Metals -Forwarded -Reply -Reply  
-Reply -Forwarded -Reply

John, this site has a long history of city, state, OSHA and USEPA (Air, RCRA, and CERCLA) involvement. The plant ceased operations in 1994. A CERCLA PRP Removal action to clean-up surface contamination began 4/97 and was completed 10/97. The PRP's are in the process of preparing an Engineering Evaluation/Cost Analysis (EE/CA). When completed, this will determine what additional remediation will be needed. You may want to contact Jeff Heath, who is the current RPM for the site, for more information.

The 3rd and 4th quarter 1997 violations appear to coincide with the surface cleanup. Are these values higher or lower than prior to the surface clean-up? If I recall correctly, the PRP's contractor also monitored the lead in air during the clean-up. It would be interesting to compare the data. Perhaps Jeff could make the data available to you. Also, your data may be of interest to Jeff.

In any event, could you provide me with a summary of the data over time? I would like to see if there is a trend that we could use to report environmental progress, and hopefully eventually an environmental result. These data would also be of interest to the Toxic Sweep Task Force.

**CC:** R5AIR.R5ARD.BORTZER-JAY, R5WST.R5WASTE.HEATH-JEFF

0061	96	01	00.42
0061	96	02	00.05
0061	96	03	00.13
0061	96	04	00.07
0061	96	05	00.73
0061	96	06	00.11
0061	96	07	00.17
0061	96	08	00.11
0061	96	09	00.06
0061	96	10	00.03
0061	96	11	00.03
0061	96	12	00.03
0061	97	01	00.05
0061	97	02	00.04
0061	97	03	00.01
0061	97	04	00.04
0061	97	05	00.03
0061	97	06	00.13
0061	97	07	01.82
0061	97	08	01.20
0061	97	09	03.82
0061	97	10	02.51
0061	97	11	02.08
0061	97	12	00.17
0061	98	01	00.15
0061	98	02	00.55
0061	98	03	00.14
0061	98	04	00.16
0061	98	05	00.14
0061	98	06	00.09
0061	98	07	00.12
0061	98	08	00.08
0063	96	01	01.40
0063	96	02	00.81
0063	96	03	00.96
0063	96	04	01.57
0063	96	05	00.42
0063	96	06	00.67
0063	96	07	00.61
0063	96	08	00.68
0063	96	09	00.18
0063	96	10	00.17
0063	96	11	00.20
0063	96	12	00.36
0063	97	01	00.89
0063	97	02	00.65
0063	97	03	00.40
0063	97	04	00.78
0063	97	05	00.26
0063	97	06	03.37
0063	97	07	04.54
0063	97	08	01.66
0063	97	09	06.75
0063	97	10	08.35
0063	97	11	01.71

3.02

.735

1.48

?

0063	97	12	00.74
0063	98	01	00.32
0063	98	02	00.26
0063	98	03	01.37
0063	98	04	00.50
0063	98	05	00.40
0063	98	06	00.41
0063	98	07	00.33
0063	98	08	00.13

TABLE 3-1  
PM10 and MiniRAM Air Data

Date	PM10		Results (ug/m3)		MiniRAM
	Sample ID	Monitor ID	PM < 10 u	Total Pb	(mg/m3)
	Action Levels:		150	1.5	TWA 0.15
	HV-335	C157-3			-
	HV-336	C157-4			TWA 0.08
10/14/97	HV-337	C157-1			0.03
	HV-338	C157-2			-
	HV-339	C157-3			0.03
	HV-340	C157-4			TWA 0.04
10/15/97	HV-341	C157-1	41	0.52	0.11
	HV-342	C157-2	30.6	0.2	0.07
	HV-343	C157-3	40.2	3	0.05
	HV-344	C157-4	60.7	9.5	TWA 0.06
10/16/97	HV-345	C157-1			0.09
	HV-346	C157-2			-
	HV-347	C157-3			0.04
	HV-348	C157-4			TWA 0.08
10/17/97	HV-349	C157-1			0.08
	HV-350	C157-2			0.05
	HV-351	C157-3			-
	HV-352	C157-4			TWA 0.03
10/20/97	HV-353	C157-1			0.05
	HV-354	C157-2			0.02
	HV-355	C157-3			-
	HV-356	C157-4			TWA 0.05
10/21/97	HV-357	C157-1			0.1
	HV-358	C157-2			0.03
	HV-359	C157-3			-
	HV-360	C157-4			TWA 0.07
10/22/97	HV-361	C157-1			0.09
	HV-362	C157-2			0.05
	HV-363	C157-3			0.07
	HV-364	C157-4			TWA 0.08
10/23/97	HV-365	C157-1	14.9	0.21	0.11
	HV-366	C157-2	12.8	< 0.15	0.13
	HV-367	C157-3	20.6	1.6	0.07
	HV-368	C157-4	36.7	< 0.15	TWA 0.10
10/24/97	HV-369	C157-1			0.1
	HV-370	C157-2			0.1
	HV-371	C157-3			0.09
	HV-372	C157-4			TWA 0.10

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
SCR-01	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.270 0.466	mg/L mg/L
SCR-02	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.129 5.59	mg/L mg/L
SCR-03	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.025 < 0.080	mg/L mg/L
SCR-04	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.293 6.17	mg/L mg/L
SCR-05	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.053 0.259	mg/L mg/L
SCR-06	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.117 0.744	mg/L mg/L
SCR-07	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.241 0.673	mg/L mg/L
SCR-08	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.170 < 0.080	mg/L mg/L
SCR-09	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.161 0.587	mg/L mg/L
SCR-10	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.062 0.240	mg/L mg/L
SCR-11	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.071 0.525	mg/L mg/L
SCR-12	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.091 0.193	mg/L mg/L
SCR-13	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.027 < 0.080	mg/L mg/L
SCR-14	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.050 0.143	mg/L mg/L
SCR-15	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.073 0.124	mg/L mg/L

TABLE 5-1  
Scarification Verification Results

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
SCR-16	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	< 0.010 < 0.080	mg/L mg/L
SCR-17	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	< 0.010 < 0.080	mg/L mg/L
SCR-18	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	< 0.010 < 0.080	mg/L mg/L
SCR-19	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.522 < 0.080	mg/L mg/L
SCR-20	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	1.02 0.990	mg/L mg/L
SCR-21	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	1.56 0.204	mg/L mg/L
SCR-22	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.392 0.836	mg/L mg/L
SCR-23	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.159 0.331	mg/L mg/L
SCR-24	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	1.050 0.282	mg/L mg/L
SCR-25	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.580 < 0.080	mg/L mg/L
SCR-26	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.838 0.115	mg/L mg/L
SCR-27	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.754 0.425	mg/L mg/L
SCR-28	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.326 0.126	mg/L mg/L
SCR-29	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.340 0.776	mg/L mg/L
SCR-30	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.677 0.966	mg/L mg/L

TABLE 5-1  
Scarification Verification Results

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
SCR-31	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.621 0.343	mg/L mg/L
SCR-32	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.044 0.090	mg/L mg/L
SCR-33	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.116 < 0.080	mg/L mg/L
SCR-34	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.080 < 0.080	mg/L mg/L
SCR-35	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	0.381 0.814	mg/L mg/L
SCR-36	interior baghouse cinder block post-blasting	TCLP Cd TCLP Pb	< 0.010 < 0.080	mg/L mg/L
SCR-02-2	interior baghouse cinder block post retreatment of entire wall	TCLP Cd TCLP Pb	0.015 0.083	mg/L mg/L
SCR-04-2	interior baghouse cinder block post retreatment of entire wall	TCLP Cd TCLP Pb	0.057 0.122	mg/L mg/L
SCR-20-2	interior baghouse cinder block post retreatment of entire wall	TCLP Cd TCLP Pb	0.528 3.84	mg/L mg/L
SCR-21-2	interior baghouse cinder block post retreatment of entire wall	TCLP Cd TCLP Pb	0.577 0.683	mg/L mg/L
SCR-24-2	interior baghouse cinder block post retreatment of entire wall	TCLP Cd TCLP Pb	0.132 0.224	mg/L mg/L

TABLE 5-2  
Exterior Decontamination Verification Results

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
BRCK-01	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.014	mg/L
		TCLP Pb	0.439	mg/L
BRCK-02	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.138	mg/L
		TCLP Pb	5.14	mg/L
BRCK-03	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.041	mg/L
		TCLP Pb	1.38	mg/L
BRCK-04	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.068	mg/L
		TCLP Pb	0.746	mg/L
BRCK-05	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.021	mg/L
		TCLP Pb	2.82	mg/L
BRCK-06	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.049	mg/L
		TCLP Pb	1.23	mg/L
BRCK-07	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.049	mg/L
		TCLP Pb	6.39	mg/L
BRCK-08	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.067	mg/L
		TCLP Pb	19.8	mg/L
BRCK-09	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.046	mg/L
		TCLP Pb	1.40	mg/L
BRCK-10	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.071	mg/L
		TCLP Pb	3.28	mg/L
BRCK-02-2	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.092	mg/L
		TCLP Pb	4.48	mg/L
BRCK-07-2	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.036	mg/L
		TCLP Pb	0.263	mg/L
BRCK-08-2	exterior baghouse brick post-blasting	TCLP As	< 0.20	mg/L
		TCLP Cd	0.068	mg/L
		TCLP Pb	0.962	mg/L

Grid	Total Lead (ppm)			average	Description
	1	2	3		
A1	310	1300	3570	1727	dk gray slag/ black cinders
B1	3390	35560	39340	26097	dk gray slag/ black cinders
C1	584	985	1699	1089	lt gray slag/ black cinders
D1	15540	26460	14140	18713	lt gray slag/ black cinders
E1	8770	1081	7110	5654	lt gray slag/ black cinders
F1	768	6640	683	2697	lt gray slag/ black cinders
G1	2910	28700	6560	12723	lt gray-rust slag/ black cinders
H1	3530	6650	26370	12183	lt gray-rust slag/ black cinders
I1	767	23730	12590	12362	white sludge
I2	297	4655	19840	8264	dk brown slag
I3	17145	3275	30120	16847	brown, rust slag
J1	766	6220	820	2602	white sludge
J2	185	702	11575	4154	black, dk brown, rust slag
J3	9895	20220	701	10272	black, brown, rust slag
K1	35	58	20910	7001	white sludge
K2	347	3900	30265	11504	black, dk brown, brown slag
K3	62	4414	313	1596	white sludge/ dk brown slag
L1	139	174	698	337	white sludge
L2	31930	14130	59555	35205	gray slag/gravel
M1	4225	8665	31205	14698	brown, gray slag/gravel
M2	15510	12945	15415	14623	gray, brown slag
N1	3995	5590	8430	6005	brown slag
O1	6090	15490	4380	8653	black, dk brown, rust slag
O2	26760	5660	15650	16023	brown, gray, rust slag/gravel
P1	510	1010	3935	1818	brown slag/gravel, tan coarse sand
P2	14165	19255	7855	13758	gray slag fines/gravel
Q1	103	2295	770	1056	brown slag/tan-gray coarse sand
R1	39450	38570	499	26173	white sludge/ lt gray slag/ cinders
S1	2594	25890	5590	11358	white sludge/ dk gray slag/ cinders
T1	388	648	8220	3085	white sludge/ gray cinders
U1	9260	3630	709	4533	white sludge/ gray-black cinders
V1	552	674	4270	1832	brown, rust slag/ cinders
W1	25	2680	4180	2295	black, brown, rust slag
X1	1436	8685	6235	5452	black, brown, rust slag
Y1	5690	4190	123	3334	black, brown, rust slag
Z1	1450	4440	51	1980	black, brown, rust slag

Grid	Total Lead (ppm)			average	Description
	1	2	3		
AA1	930	51	25	335	tan coarse sand/gravel
BB1	481	110	180	257	tan coarse sand/gravel
CC1	5400	14850	4840	8363	brown coarse sand/gravel, white-gray slag
CC2	9860	10380	6570	8937	brown coarse sand/gravel, white-gray slag
DD1	15720	1836	3350	6969	lt brown coarse sand/gravel
DD2	1596	5000	3020	3205	white-gray slag, brown sand/gravel
EE1	1720	106	272	699	tan coarse sand/gravel
EE2	1120	327	380	609	tan coarse sand/gravel
FF1	740	1716	2506	1654	brown coarse sand/small gravel
FF2	248	2618	1531	1466	brown coarse sand/ small gravel
GG1	1667	1645	130	1147	brown coarse sand/ small gravel
GG2	178	2586	1104	1289	brown coarse sand/ small gravel
HH1	3475	2028	2068	2524	med brown sand/ fine gravel
II1	35	28	742	268	med brown sand/ fine gravel

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
E-Z1-24"	analytical extent of contamination	Total As	1,150	mg/kg
		Total Cd	12.2	mg/kg
		Total Pb	11,600	mg/kg
E-CC1-24"	analytical extent of contamination	Total As	3,280	mg/kg
		Total Cd	48.8	mg/kg
		Total Pb	15,900	mg/kg
E-DD1-24"	analytical extent of contamination	Total As	365	mg/kg
		Total Cd	17.5	mg/kg
		Total Pb	11,400	mg/kg

<u>Sample ID</u>	<u>Description</u>	<u>Total Metals (ug/g)</u>			<u>TCLP Metals (ug/g)</u>	
		Pb	Cd	As	Pb	Cd
SDY-01	gross surface contamination	96,000	1,600	1,300	130	55.5
	second sample	89,000	-	-	1,390	-
SDY-02	refractory brick	80,000	-	-	2,180	1.26
SDY-03	soil - roll off	56,000	-	-	52.0	-
SDY-04	furnace/ball mill materials	86,000	-	-	42.8	75.3
	second sample	104,000	1,400	990	365	21.5
SDY-05	gray powder	75,000	-	-	782	51.2
SDY-06	white powder	70,000	-	-	1,210	0.045
SDY-07	leaded glass	12,000	-	-	177	<0.010
SDY-08	dark gray waste pile	48,000	110	180	840	1.38
SDY-09	on-site soil excavated	17,000	61	220	1,400	3.54
SDY-09-2	on-site soil excavated	77,000	68	230	508	2.72
SDY-10	refining samples	84,000	18	430	1,090	<0.10
SDY-11	glazing by-product	155,000	320	380	1,900	3.86
SDY-12	drummed solid waste material	130,000	690	250	620	6.89

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TABLE 8-2  
Treatability Study Results

Master Metals Site

<u>Sample ID</u>	<u>Treatment</u>	<u>Description</u>	<u>Total Metals (ug/g)</u>			<u>TCLP Metals (mg/L)</u>		
			Pb	Cd	As	Pb	Cd	As
SDY-01		<b>gross surface contamination</b>	96,000	1,600	1,300	130	55.5	<2.0
		second sample	89,000	-	-	1,390	-	-
	2%	treatment reagent added				1,340	-	-
	4%	treatment reagent added				577	-	-
	6%	treatment reagent added				194	-	-
	8%	treatment reagent added				114	-	-
	5%-5%	treatment blend added				9.36	2.44	<2.0
SDY-02		<b>refractory brick</b>	80,000	-	-	2,180	1.26	15.1
	2%	treatment reagent added				1,050	-	-
	4%	treatment reagent added				966	-	-
	6%	treatment reagent added				3.57	-	-
SDY-03		<b>roll off boxes of soil/gravel</b>	56,000	-	-	52	-	-
	2%	treatment reagent added				1.51	-	-
	4%	treatment reagent added				1.08	-	-
	6%	treatment reagent added				0.509	-	-
SDY-04		<b>furnace and ball mill material</b>	86,000	-	-	42.8	75.3	-
		second sample	104,000	1,400	990	365	21.5	<2.0
	2%	treatment reagent added				61.9	27.6	-
	4%	treatment reagent added				49.2	28.8	-
	6%	treatment reagent added				4.03	10	-
	10%	treatment reagent added				18.7	3.62	-
	15%	treatment reagent added				2.81	1.97	1.58
	5%-5%	treatment blend added				9.36	2.44	<2.0
	10%-5%	treatment blend added				< 0.80	< 0.050	< 2.0

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TABLE 8-2  
Treatability Study Results

Master Metals Site

<u>Sample ID</u>	<u>Treatment</u>	<u>Description</u>	<u>Total Metals (ug/g)</u>			<u>TCLP Metals (mg/L)</u>		
			Pb	Cd	As	Pb	Cd	As
FRN 1,3,4, 5=BLM 1,2	8%	furnace and ball mill material	65,000	3,400	-	30.8	130	-
		treatment reagent added				5.44	31.7	-
SDY-05		gray powder (supersacks)	75,000	-	-	782	51.2	5.15
	2%	treatment reagent added				557	-	-
	4%	treatment reagent added				537	-	-
	6%	treatment reagent added				530	-	-
SDY-06		white powder (drums & supersacks)	70,000	-	-	1,210	0.045	8.59
	2%	treatment reagent added				27.7	-	-
	4%	treatment reagent added				5.4	-	-
	6%	treatment reagent added				1.42	-	-
SDY-07		lead glass material	12,000	-	-	1.26	<0.10	<2.0
	2%	treatment reagent added				16.2	-	-
	4%	treatment reagent added				< 0.800	-	-
	6%	treatment reagent added				3.28	-	-
	8%	treatment reagent added				4.27	-	-
SDY-08		dark gray waste pile	48,000	110	180	840	1.38	0.0226
	2%	treatment reagent added				900	4.09	-
	4%	treatment reagent added				4.34	0.286	-
	6%	treatment reagent added				1.42	0.172	-
SDY-09		excavated soil from on site	17,000	61	220	1,400	3.54	0.0899
	4%	treatment reagent added				877	1.47	-
	6%	treatment reagent added				408	1.32	-
	8%	treatment reagent added				45.8	1.11	-

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TABLE 8-2  
Treatability Study Results

Master Metals Site

<u>Sample ID</u>	<u>Treatment</u>	<u>Description</u>	<u>Total Metals (ug/g)</u>			<u>TCLP Metals (mg/L)</u>		
			Pb	Cd	As	Pb	Cd	As
<b>SDY-09-2</b>		<b>excavated soil from on site</b>	77,000	68	230	508	2.72	< 2.0
	2%	treatment reagent added				18.9	-	-
	4%	treatment reagent added				1.59	-	-
	6%	treatment reagent added				4.06	-	-
<b>SDY-10</b>		<b>composite of 2 gal sample buckets</b>	84,000	18	430	1,090	< 0.10	< 2.0
	6%	treatment reagent added				961	-	-
	8%	treatment reagent added				556	-	-
	10%	treatment reagent added				356	-	-
<b>SDY-11</b>		<b>roll off boxes of glazing by-product</b>	155,000	320	380	1,900	3.86	<2.0
	10%	treatment reagent added				122	2.29	< 2.0
	5%-5%	treatment blend added				42	1.95	<2.0
	10%-5%	treatment blend added				9.64	<0.050	<2.0
<b>SDY-12</b>		<b>solid drummed material (dross, etc)</b>	130,000	690	250	620	6.89	<2.0
	10%	treatment reagent added				293	4.86	<2.0
	5%-5%	treatment blend added				110	3.19	<2.0
	10%-5%	treatment blend added				0.125	0.022	<2.0

<u>Sample ID</u>	<u>Description</u>	<u>Analysis</u>	<u>Result</u>	<u>Units</u>
TS-01	treatment verification	TCLP As	< 0.50	mg/L
		TCLP Cd	0.407	mg/L
		TCLP Pb	2.32	mg/L
TS-02	treatment verification	TCLP As	1.15	mg/L
		TCLP Cd	0.456	mg/L
		TCLP Pb	1.35	mg/L
TS-03	treatment verification	TCLP As	1.36	mg/L
		TCLP Cd	0.162	mg/L
		TCLP Pb	2.18	mg/L
TS-04	treatment verification	TCLP As	1.72	mg/L
		TCLP Cd	0.88	mg/L
		TCLP Pb	0.505	mg/L
TS-05	treatment verification	TCLP As	1.90	mg/L
		TCLP Cd	0.306	mg/L
		TCLP Pb	1.50	mg/L
TS-06	treatment verification	TCLP As	3.58	mg/L
		TCLP Cd	0.116	mg/L
		TCLP Pb	1.57	mg/L
TS-07	treatment verification	TCLP As	9.26	mg/L
		TCLP Cd	0.360	mg/L
		TCLP Pb	2.91	mg/L
TS-08	treatment verification	TCLP As	< 0.50	mg/L
		TCLP Cd	16.4	mg/L
		TCLP Pb	85.3	mg/L
TS-07 retreat	verification of retreated material	TCLP As	< 0.50	mg/L
		TCLP Cd	0.973	mg/L
		TCLP Pb	81.20	mg/L
TS-08 retreat	verification of retreated material	TCLP As	0.85	mg/L
		TCLP Cd	0.375	mg/L
		TCLP Pb	5.01	mg/L
TS-07 retreat	verification of retreated material	TCLP As	0.63	mg/L
		TCLP Cd	0.390	mg/L
		TCLP Pb	1.78	mg/L
TS-08 retreat	verification of retreated material	TCLP As	2.31	mg/L

TABLE 8-3  
Treatment Verification Results

		TCLP Cd	0.183	mg/L
		TCLP Pb	0.70	mg/L
TS-09	treatment verification	TCLP As	< 0.50	mg/L
		TCLP Cd	4.00	mg/L
		TCLP Pb	4.92	mg/L
TS-09 retreat	verification of retreated material	TCLP As	0.640	mg/L
		TCLP Cd	0.751	mg/L
		TCLP Pb	3.03	mg/L
TS-10	treatment verification	TCLP As	1.18	mg/L
		TCLP Cd	0.383	mg/L
		TCLP Pb	2.86	mg/L
TS-11	treatment verification	TCLP As	0.810	mg/L
		TCLP Cd	0.868	mg/L
		TCLP Pb	5.62	mg/L
TS-11 retreat	verification of retreated material	TCLP As	0.520	mg/L
		TCLP Cd	0.655	mg/L
		TCLP Pb	1.77	mg/L
TS-12	treatment verification	TCLP As	1.02	mg/L
		TCLP Cd	0.354	mg/L
		TCLP Pb	3.53	mg/L
TS-13	treatment verification	TCLP As	0.577	mg/L
		TCLP Cd	0.955	mg/L
		TCLP Pb	2.38	mg/L
TS-14	treatment verification	TCLP As	1.76	mg/L
		TCLP Cd	0.168	mg/L
		TCLP Pb	2.25	mg/L
TS-15	treatment verification	TCLP As	1.23	mg/L
		TCLP Cd	0.225	mg/L
		TCLP Pb	2.35	mg/L
TS-16	treatment verification	TCLP As	1.30	mg/L
		TCLP Cd	0.315	mg/L
		TCLP Pb	2.42	mg/L
TS-17	treatment verification	TCLP As	0.970	mg/L
		TCLP Cd	0.375	mg/L
		TCLP Pb	2.00	mg/L
TS-18	treatment verification	TCLP As	1.16	mg/L
		TCLP Cd	0.474	mg/L

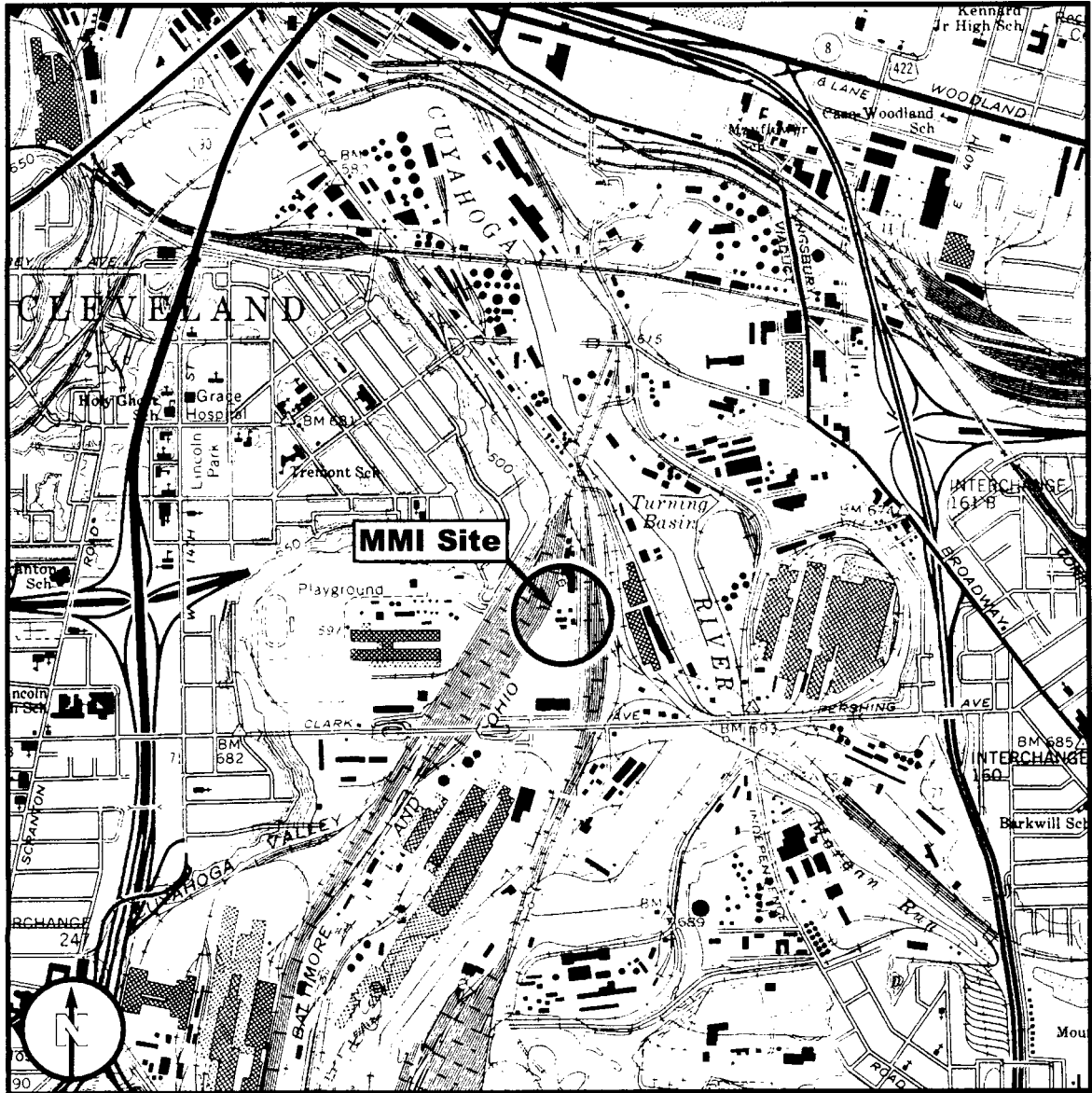
TABLE 8-3  
Treatment Verification Results

		TCLP Pb	2.12	mg/L
TS-19	treatment verification	TCLP As	1.44	mg/L
		TCLP Cd	0.315	mg/L
		TCLP Pb	1.12	mg/L
TS-20	treatment verification	TCLP As	1.03	mg/L
		TCLP Cd	0.800	mg/L
		TCLP Pb	1.48	mg/L
TS-21	treatment verification	TCLP As	1.31	mg/L
		TCLP Cd	0.536	mg/L
		TCLP Pb	1.88	mg/L
TS-22	treatment verification	TCLP As	1.04	mg/L
		TCLP Cd	0.414	mg/L
		TCLP Pb	2.07	mg/L
TS-23	treatment verification	TCLP As	1.27	mg/L
		TCLP Cd	0.639	mg/L
		TCLP Pb	2.10	mg/L
TS-24	treatment verification	TCLP As	0.860	mg/L
		TCLP Cd	0.470	mg/L
		TCLP Pb	1.47	mg/L
TS-25	treatment verification	TCLP As	0.700	mg/L
		TCLP Cd	0.405	mg/L
		TCLP Pb	1.05	mg/L

# SITE LOCATION MAP

**ENTACT**  
 Environmental Technology Associates, Inc.

CLEVELAND SOUTH QUADRANGLE OHIO-CUYAHOGA CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC)



SCALE 1:4000

6° 27' 11.5" M  
 115 M  
 0° 27' 8" M  
 8 M

CONTOUR INTERVAL: 10 FEET  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929  
 DEPTH CURVES AND SOUNDINGS IN FEET DATUM IS LOW WATER 670.5 FEET

UTM GRID AND 1984 MAGNETIC NORTH  
 DECLINATION AT CENTER OF SHEET

**Figure 1-1**

**MASTER METALS**

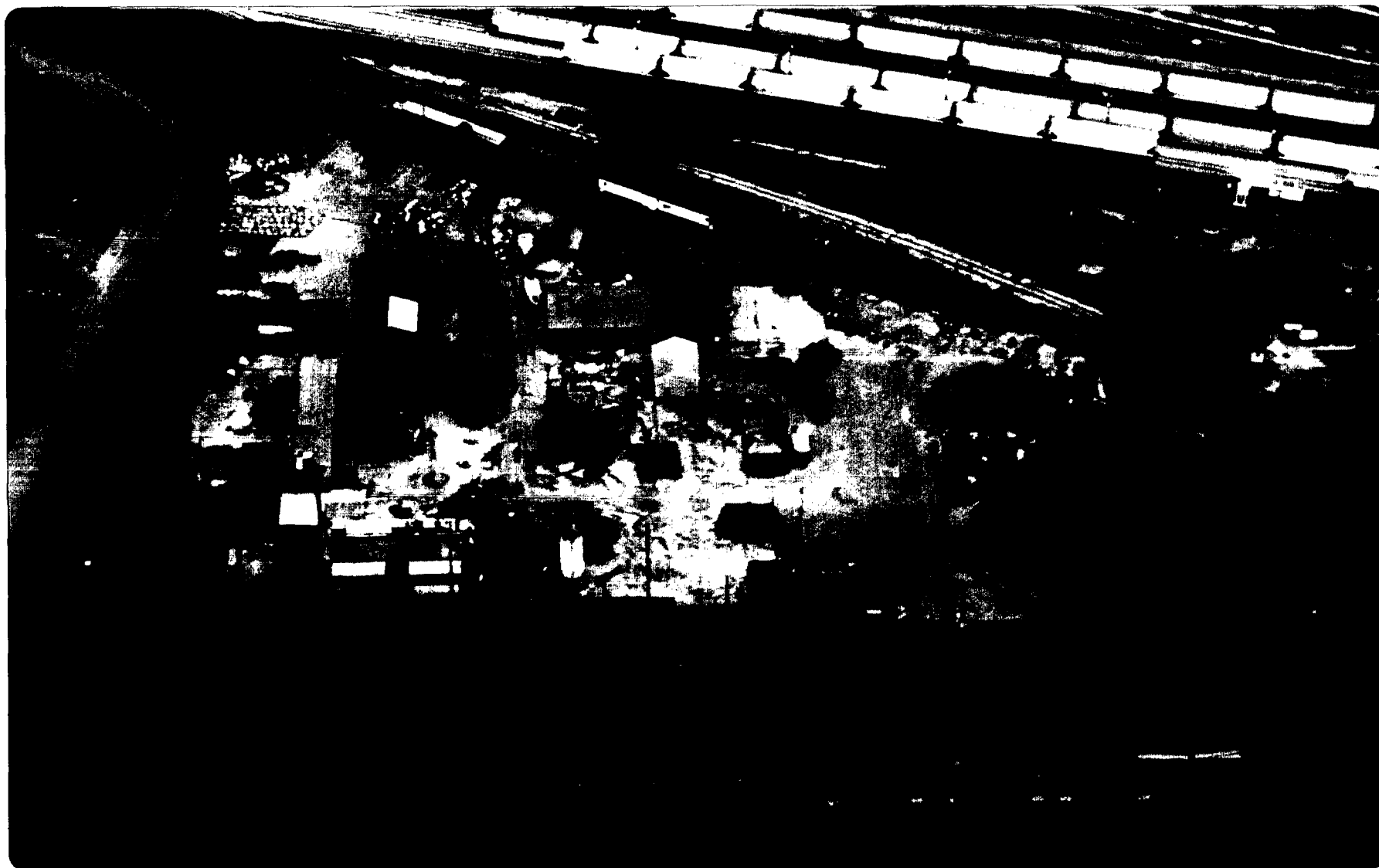
**SITE**

Cleveland, Ohio

FINAL REPORT

*Figure 1-2*

**AERIAL VIEW OF FACILITY PRIOR TO REMOVAL ACTION**



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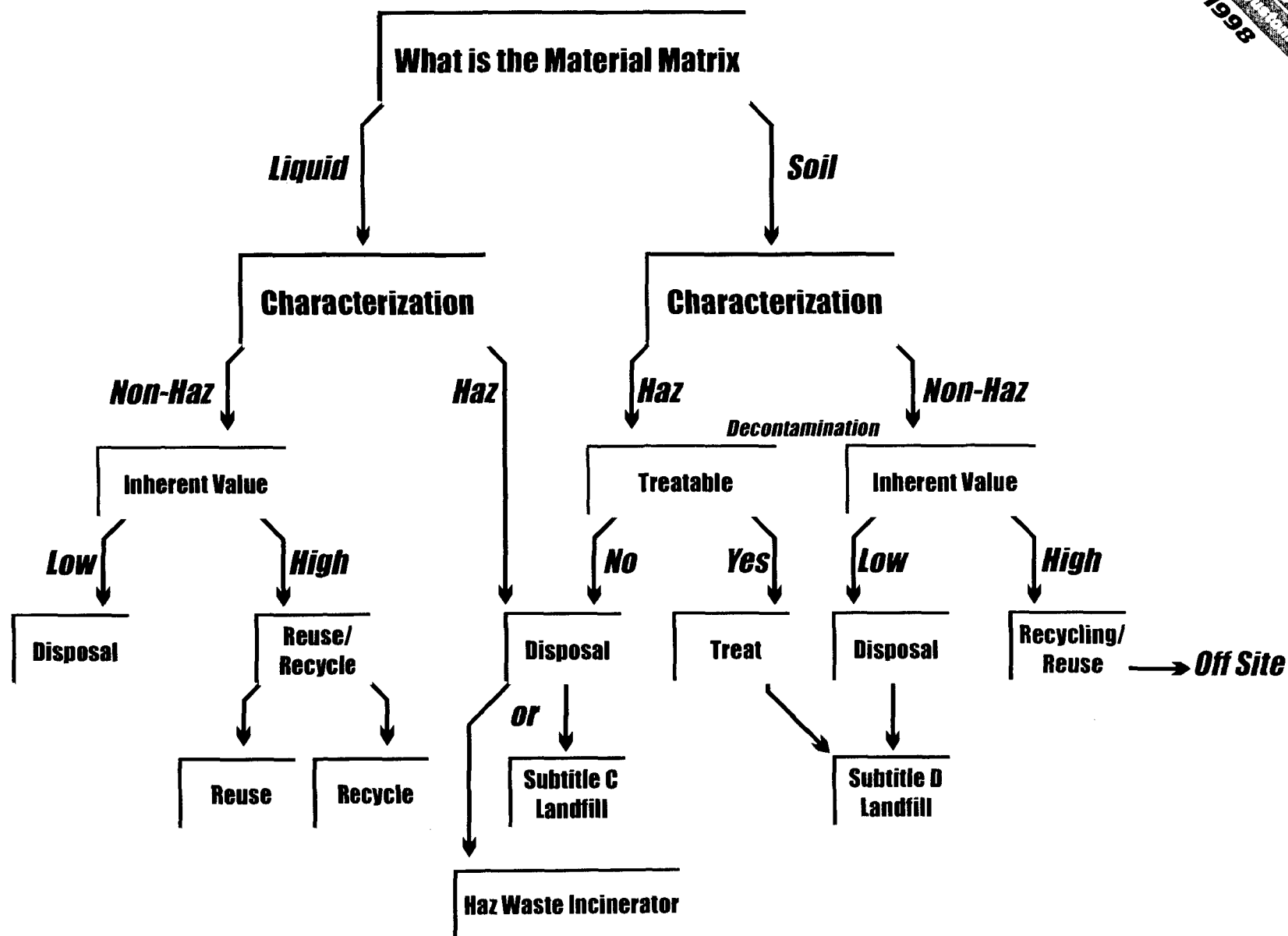
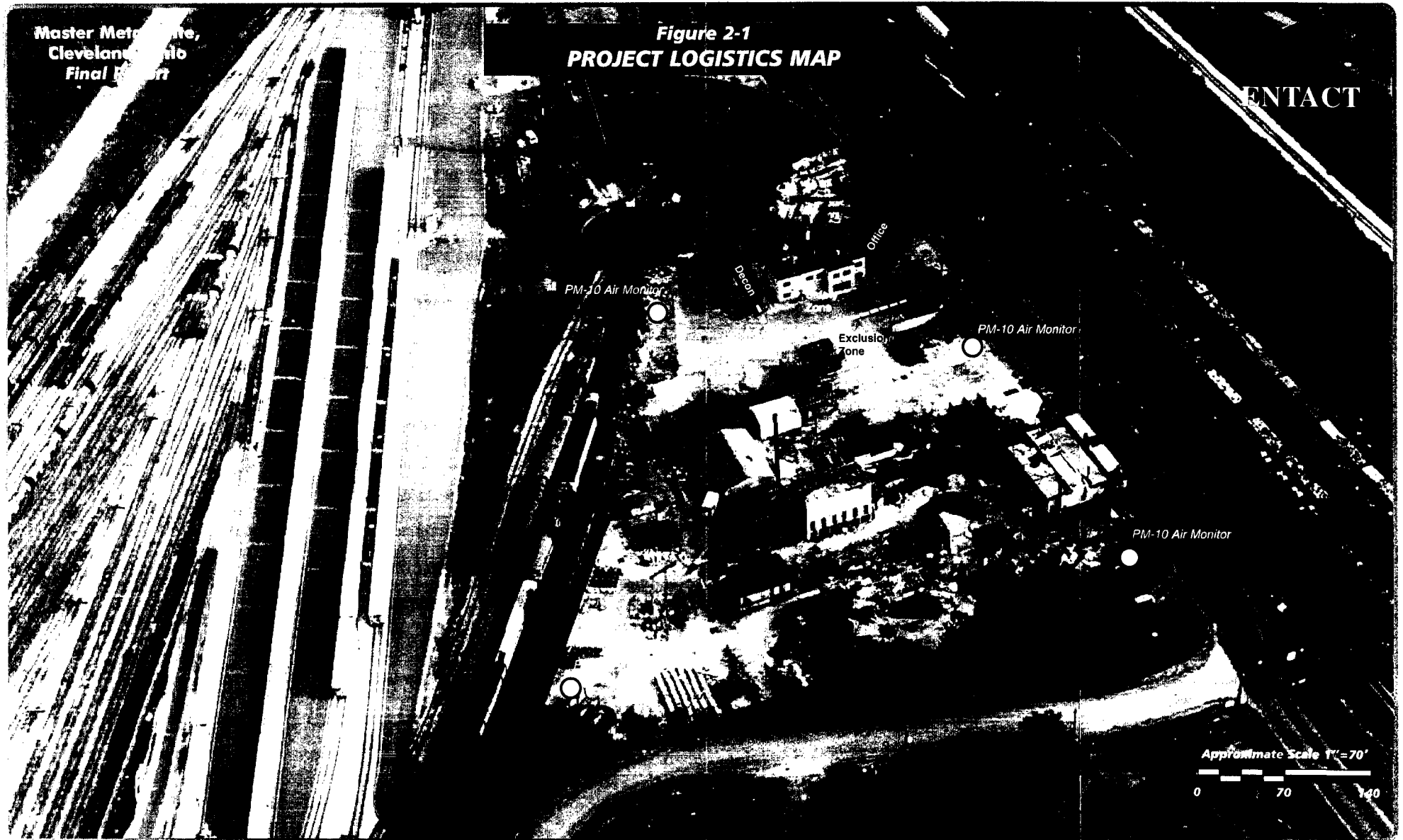


Figure 2-1  
**PROJECT LOGISTICS MAP**

CONTACT



MASTER METALS

SITE

Cleveland, Ohio

FINAL REPORT

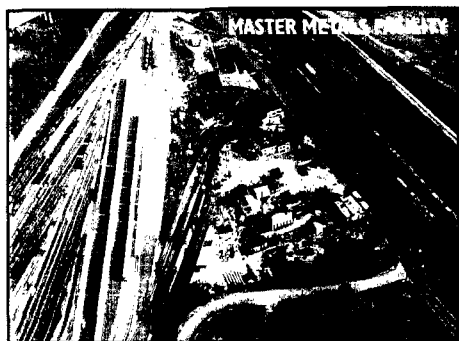
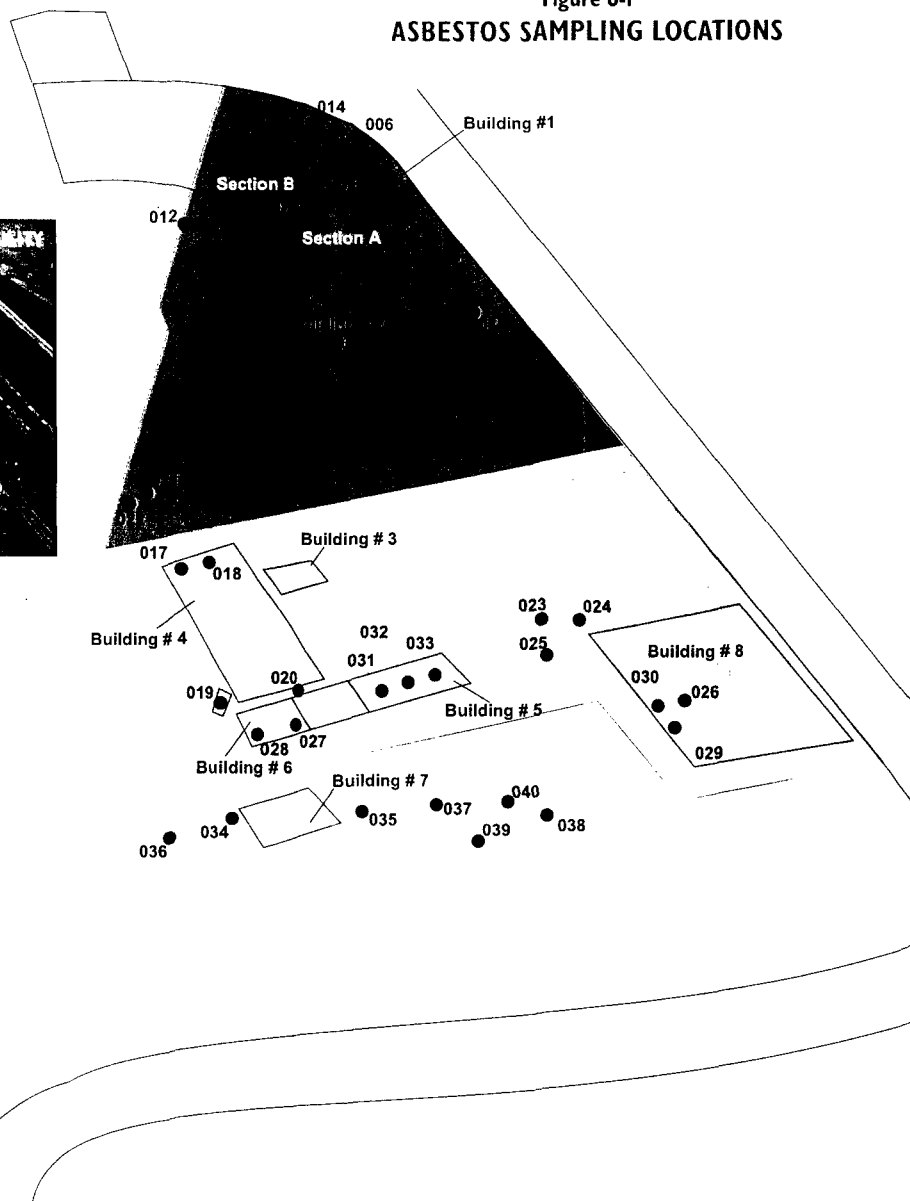


Figure 6-1  
ASBESTOS SAMPLING LOCATIONS

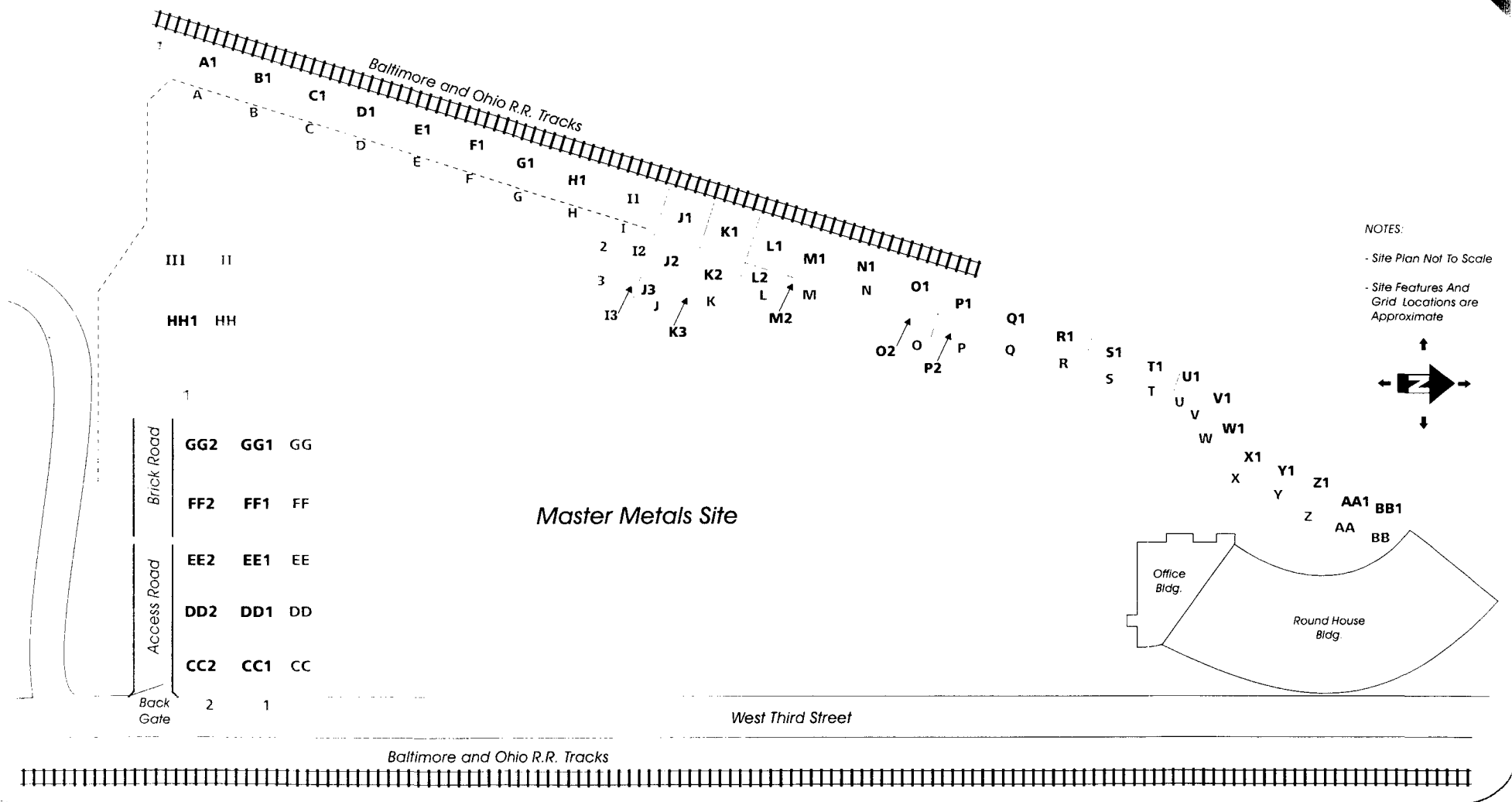


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Date	Sample #	Sample ID/Description	Location
6/11/97	001	Roof Mastic	Bldg #1 - Sec A
6/11/97	002	Roof Felt	Bldg #1 - Sec A
6/11/97	003	Roof Felt	Bldg #1 - Sec A
6/11/97	004	Roof Material	Bldg #1 - Sec A
6/11/97	005	Roof Felt	Bldg #1 - Sec B
6/11/97	006	Roof Flashing	Bldg #1 - Sec B
6/11/97	007	Roof Felt	Bldg #1 - Sec B
6/11/97	008	Roof Mastic	Bldg #1 - Sec B
6/11/97	009	Roof Mastic	Bldg #2
6/11/97	010	Ceiling Tile	Area A
6/11/97	011	Cloth Material	Area A
6/11/97	012	Fire Brick	Area A
6/11/97	013	Board Material	Area A
6/11/97	014	TSI Pipe	Bldg #1 - Sec B
6/11/97	015	TSI Pipe	Bldg #1 - Sec B
6/11/97	016	Roof Felt	Area A - Bldg #1
6/11/97	017	Roof Insulation	Bldg #4
6/11/97	018	Roof Insulation	Bldg #4
6/11/97	019	Equipment Insulation	Bldg #4
6/11/97	020	Cloth Material	Area B
6/11/97	021	Fire Brick in Kiln	Area A
6/11/97	022	Cloth Material	Area A
6/11/97	023	Brick Insulation in 36" Pipe	Area B - Bldg #8
6/11/97	024	Fire Brick in Vertical Vessel	Area B - Bldg #8
6/11/97	025	Fire Brick in Horizontal Kiln	Area B - Bldg #8
6/11/97	026	Roof Material	Area B - Bldg #8
6/11/97	027	Roofing/Mastic	Area B - Bldg #6
6/11/97	028	Roofing/Mastic	Area B - Bldg #6
6/11/97	029	Roofing	Area C - Bldg #8
6/11/97	030	Roofing	Area C - Bldg #8
6/11/97	031	Roofing/Mastic	Area B - Bldg #5
6/11/97	032	Roofing/Mastic	Area B - Bldg #5
6/11/97	033	Roofing/Mastic	Area B - Bldg #5
6/11/97	034	Gasket Material	Area C - Bldg #7
6/11/97	035	Gasket Material	Area C - Bldg #7
6/11/97	036	Belt Material	Area C
6/11/97	037	Transite Siding	Area C
6/11/97	038	Transite Siding	Area C
6/11/97	039	Transite Siding	Area C
6/11/97	040	Transite Siding	Area C

**Figure 7-1**  
**AREAS REQUIRING EXCAVATION**

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NOTES:  
 - Site Plan Not To Scale  
 - Site Features And Grid Locations are Approximate

## **CONFIDENTIAL INFORMATION OF ENTACT**

*Entact uses proprietary technology in additive and treatment processing to achieve its fixation and permeability results. Patents are both issued and pending, including U.S. Patent # 5,588,947, # 5,591,116, and # 5,667,696.*

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